



AMERICAN GAS

Association

MONTHLY

JUNE 1947

•

VOL. 29 • NO. 6



*Before you install your
dream of a dishwasher...*

Think! Is your hot water-heater *modern* enough to make one of these do-everything dishwashers work efficiently? For before this marvelously automatic machine can get grease off dirty dishes and steam-dry them sparkling clean... it *must* be fed with gallons of constant **HOT** water! A new automatic Gas water-heater is the most *economical and practical* way to get this kind of hot water supply. Speed is the secret! Gas heats so fast it restores even high temperature water almost as it is drawn off... is always ready 24 hours a day without any waiting around or running downstairs. Actually, dishwasher—or dishpan—no up-to-date household can *afford* to be without an automatic Gas water-heater. Order one in the right size for your family, today.



GAS

*for the last word in
automatic water-heating*



THE HOTTER THE WATER... the whiter the wash! That's why an automatic Gas water-heater is best for laundering — as well as all the other clean-up jobs in the house. See the new models at your Gas Company, Plumbing Shop or Appliance Dealer's. **AMERICAN GAS ASSOCIATION**

Shown at the left is the second of three American Gas Association advertisements on automatic gas water heating to appear in the 1947 national consumer campaign. This insertion will appear in *Ladies' Home Journal* and *Better Homes and Gardens* for June; *Good Housekeeping* for August, and *American Home and Parents* for May.

The main art element in each advertisement will depict alternately the modern and efficient bathroom, laundry and kitchen. The headline will dramatize the importance of hot water in actual operation as pictured in the main illustration. Copy will stress essentiality of the automatic gas water heater in making the bathroom, laundry or kitchen truly modern and efficient. Emphasis will be on speed of recovery, economy of use and other features.



Running through the following pages is the timely theme—Industrywide Action—a keynote which cannot be ignored. . . . First of all, announcement is made of a powerful industrywide advertising campaign which will open immediately after Labor Day to plug the new automatic gas range with the slogan "Gas Has Got It." . . . "Winning Seals of Approval," an elaborate sound-color motion picture, will be released shortly for showing throughout the country. . . . Gas industry achievements will now be recognized by six awards, one more than last year. . . . A call for the industry to exert every effort to aid establishment of a more stable rate regulatory procedure is voiced by C. F. DeMey. . . . Irving K. Peck's timely contribution to constructive industry-wide thinking summarizes problems of the house heating load. It also underlines the fact, pointed out in another feature, that curtailment of gas service in some areas is due largely to shortages of production and distribution materials and not to shortage of gas itself. . . . Don't overlook the American Gas Association's Natural Gas Convention which tackled national level problems with encouraging candor. . . . So saying, we offer this issue of the MONTHLY as Exhibit A—proof that gas men are grasping past lessons and are ordering larger "walking shoes" on a national basis.

JAMES M. BEALL
EDITOR
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Natural Gas Conference

SOME of the most vital issues confronting the nation's natural gas companies came in for searching analysis and discussion at the forty-second annual meeting of the natural gas industry at the Stevens Hotel, Chicago, April 30-May 1. The house heating load problem, conservation, well-head price fixing and underground storage stole the spotlight from numerous other important subjects discussed.

More than 500 delegates from different states attended the Spring Meeting sponsored by the Natural Gas Department of the American Gas Association which was fittingly held in Chicago, one of the first large cities to be supplied with natural gas. Robert W. Hendee, chairman, Natural Gas Department, A. G. A. Second vice-president, and president, Colorado Interstate Gas Co., Colorado Springs, presided over the general sessions.

The compact, fast-moving agenda arranged by the program committee under the chairmanship of F. C. Brown, president, Natural Gas Pipeline Company of America, included two general sessions, two outstanding meetings of the Transmission Committee, an Accounting Committee round-table conference, closed meetings of the Managing and Advisory and the Technical and Research Committees and a visit to the Institute of Gas Technology, Chicago. Mr. Hendee and Mr. Brown were assisted by George H. Smith, A. G. A. assistant managing director and director, Natural Gas Department.

A cordial welcome to Chicago by George F. Mitchell, president, The Peoples Gas Light and Coke Co., opened the general sessions on Wednesday. Mr. Mitchell reminded the delegates that "the Hub" city received its first supply of natural gas as far back as 1888 from Howard County, Ind., approximately 123 miles from the Chicago-Indiana border. One of the three wrought iron pipelines used is still in service today carrying 1000 B.t.u. gas in the opposite direction, he said, and much of the two smaller lines which were taken up for oil well casings were still in perfect condition after 30 years

of use even though they had been laid before the days of special coatings.

By way of illustrating the growth of the natural gas industry Mr. Mitchell briefly described the achievements of his company whose appetite, he said, has grown from approximately 30 billion cubic feet delivered by Natural Gas Pipeline Co. of America in 1932 to more than 80 billion cubic feet during the past year at a load factor in excess of 98 percent. Moreover, current plans of the pipeline company call for increasing capacity by more than 216 million cubic feet a day.

Following a greeting and brief remarks on the industry outlook by H. Carl Wolf, A. G. A. managing director, speaking in the absence of President R. H. Hargrove, the conference swung into what are considered some of the natural gas industry's most burning topics of the day.

The subject of well-head price fixing, currently enmeshed in a conflict of jurisdictions, is a vital question to the sprawling natural gas industry, with its more than ten million customers in 33 states and 223,000 miles of trunk pipelines. Glenn Clark, vice-president and general counsel, Cities Service Gas Co., Oklahoma City, examined the validity of well-head price fixing by state legislatures and said that the "commerce clause" of the Constitution might prove the "most formidable obstacle to any state scheme to fix well-head gas prices."

"It may credibly be assumed," he added, "that well-head price fixing of natural gas by a state could cause extreme difficulty in the gas rate regulatory fields of other states and of the Federal Power Commission. Conceivably, the price of gas to pipeline companies and to ultimate consumers would depend constantly upon sporadic changes in well-head prices.

"It is not for me to pass upon the wisdom of any state pricing of well-head gas that validly may be accomplished. However, it is not inappropriate to observe that since gas consumers far outnumber gas producers and royalty owners,

• Opposite: Air sign-post painted on top of the Southern California Gas Company's thirty-sixth street holder in Los Angeles is part of "air marking" program initiated by the Women's National Aeronautical Assn. and is a valuable navigational aid to pilots.



Robert W. Hendee



Ernest O. Thompson



A. F. Bridge, H. D. Hancock, E. F. Schmidt and H. J. Carson

the states which attempt well-head price fixing may be inviting federal control, or perhaps the extension thereof, over well-head gas prices."

New and increasing demands upon pipeline networks demand the development of knowledge which will enable the sending of greater volumes through larger diameter pipelines under greater pressure. The need for progressive study and research on new formulas of flow resulted at the spring meeting of the Natural Gas Department last year in a cooperative research agreement between A. G. A. and the U. S. Bureau of Mines. The agreement was signed in September, 1946. To coordinate this work a Pipe Line Flow Subcommittee was appointed with C. H. M. Burnham, vice-president and chief engineer, Panhandle Eastern Pipe Line Co., Chicago, as chairman. The Bureau designated J. William Ferguson, its senior natural gas engineer, to take charge of the work by the committee.

Reporting to the natural gas conference at the opening general sessions Mr.

Ferguson stated that the first phase of the project consisting of a review of literature has been completed; that the problem has been discussed with authorities in the field of fluid flow and that letters have been written to 24 gas company officials requesting information on present usage of flow equations and unpublished data or theory.

House Heating Load Analyzed

Irving K. Peck, vice-president and general manager, The Manufacturers Light & Heat Co., Pittsburgh, headed a discussion on problems of the house heating load and presented an outline of the phenomenal growth of house heating business and a careful analysis of its status in various sections of the country. He was assisted by Robert E. Ginna, vice-president, Rochester Gas & Electric Corp., who spoke on the regulation of house heating expansion by state commissions, and Arthur F. Bridge, chairman, A. G. A. Laboratories' managing committee, and vice-president and general manager, Southern Counties Gas Co., Los Angeles, who outlined the Laboratories' active part in the house-heating picture through the establishment of approval requirements for conversion burners.

A report composed of commentaries on the scope and status of research and development sponsored by the Natural Gas Department, was presented by H. D. Hancock, chairman, Technical and Research Committee, and president, Gas Advisers, Inc., New York, at the

beginning of the second General Session, May 1.

The Gas Well Deliveries Subcommittee reports continued progress in its research, in cooperation with the U. S. Bureau of Mines he stated, and consideration is being given to correlation and publication of present information in one or more comprehensive reports simultaneously with continued laboratory and field work on the flow of gas condensate fluids through cores and the gauging of the delivery capacities of condensate wells.

The Pipeline Subcommittee has been advised, Mr. Hancock said, that a final report has been substantially completed summarizing the results of its cooperative study with the Bureau of Mines on gas hydrates and may be published later this year as a Bureau of Mines Bulletin with "appropriate acknowledgement of the cooperation of the American Gas Association."

The Pipeline Flow Subcommittee reported progress in cooperative research in the field of gas flows, while the Gas Measurement Subcommittee has completed arrangements for the National Bureau of Standards to collaborate in research on the flow of gas in pipelines with special reference to investigation of the viscosities of natural gas at high temperatures. The Nitrogen Removal Subcommittee was the last included in Mr. Hancock's report. Preliminary investigation by that committee and the Bureau of Mines indicates growing interest in the possibility of coincidental removal of excess nitrogen and recovery

1948 Natural Gas Meeting Set

THE Natural Gas Department of the American Gas Association has selected Houston, Texas, on May 4 and 5, for the place and time of its Annual Spring Meeting in 1948. Headquarters will be at the Rice Hotel in Houston.



J. French Robinson, F. H. Lerch, Jr., and Irving K. Peck

of heavy hydrocarbons by low temperature liquefaction and fractionation or other methods.

An extremely timely and interesting discussion of flare gas wastage by Ernest O. Thompson, chairman, Railroad Commission of Texas, outlined advances in conservation made by the Lone Star State and emphasized that true conservation can be served better by having a "fair competitive price in the field for natural gas."

Illustrating improvements since the days when a gas well was allowed to blow its head off in the hope that it might blow into an oil well, Mr. Thompson said that when Texas plants now planned are completed only 18.4 percent of the total casinghead gas produced in the state will be flared to the air, or a utilization of about 81.6 per-

cent. In addition, he said the state's utilization and saving of liquid hydrocarbons has risen from zero to more than 200,000 barrels a day.

"Natural gas is coming into its own," Mr. Thompson continued—a statement which summed up much of the optimistic feeling evident at the conference on the future of this firmly-established industry.

The necessary laws to prevent gas waste by flaring from oil wells, have long been in effect, Mr. Thompson remarked, and now that public opinion has been aroused on the issue all that is needed is that "the fruits of conservation be given first place in the market for gas and the liquid hydrocarbons recovered in this conservation for use effort."

Hiram M. Dow, chairman, Interstate Oil Compact Commission, Roswell,

N. M., followed with an illuminating talk on conservation from the viewpoint of the Commission. He pointed out that the strength of the Commission, an association of oil and gas producing states created in 1935 to carry out the provisions of the Interstate Compact to Conserve Oil and Gas, lies in enlightened public opinion.

He noted that a strong movement is afoot for federal control of the natural gas industry and that the Federal Power Commission staff report on state conservation and activities allows producing states three years to take necessary conservation action "to eradicate every single instance of gas wastage to the air."

This is a real challenge, Mr. Dow declared, and can be met only through absolute teamwork between state and industry. "Neither can do the job alone. Maximum conservation must be more than our joint objective—it must be the motivating power of our very existence. It must be the impelling force in formulation of our program. It must weld the bonds between state and industry.

"Working together," he concluded, "the gas producing states and gas industry as a whole can eliminate every vestige of criticism, can insure that neither country nor posterity will suffer by reason of our neglect."

An informative symposium on underground gas storage was presented by the Production and Storage Committee under L. T. Potter, chairman, and assistant to the president, Lone Star Gas Co., Dallas. In the discussion E. G. Dahlgren, Interstate Oil Compact Commission, Oklahoma City, stated that his



J. William Ferguson and E. S. Pettyjohn



Hiram M. Dow, R. E. Wertz and C. H. Zachry

recently completed survey estimates that the nation's underground gas storage fields have a delivering capacity of approximately 1.5 billion cubic feet a day. He continued with a report on underground storage facilities by states, and included figures on helium storage.

"The Compact Commission hopes," he said, "that the oil and gas companies will continue their efforts to utilize underground storage to absorb excess gas supplies and maintain the operation of small stripper gas wells which doubtless would be abandoned if they were required to be shut in during the summer months."

A second speaker on the storage sym-

Co., opened the first meeting with an absorbing talk aided by colored movies on features of the 30-inch California pipeline now under construction.

Results of 2.5 years of operation with angle compressor units were outlined by O. H. Moore, assistant to vice-president, Tennessee Gas and Transmission Co., Houston, Texas. The system was constructed and manned during an extremely critical material and personnel period, he stated, and its success was due largely to the "do or die" spirit of the crews, most of whom were inexperienced in compressor station operation.

Discussing the company's experiences, he remarked that "too much cannot be

Opening feature of the final Transmission Committee meeting was the paper of E. T. P. Neubauer, engineer, Allis-Chalmers Co., on gas turbine driven centrifugal compressors for natural gas pipelines. He listed the following fundamental characteristics which make the gas turbine desirable as a source of power for natural gas pipeline work:

1. It has only rotating parts, therefore service and maintenance requirements are low, permitting a high degree of automatic compressor stations.
2. The rotative speeds are high enough to permit the use of centrifugal compressors directly connected, adding to



Institute of Gas Technology students: D. Chapin, R. Cook, W. Dow, W. Halvorsen, J. Kelly, E. Lantey and J. Selph, with Dr. Parent (left, rear) educational director of the Institute and Robert W. Hendee (right, rear) chairman, A. G. A. Natural Gas Department

posium was F. A. Hough, executive engineer, Southern Counties Gas Co., Los Angeles, who gave an excellent presentation on the importance of underground storage in pipeline operation.

A special feature added to the general sessions program this year was the presentation of seven students from the Institute of Gas Technology, embryo engineers, accounting officers and commercial managers, who hope to become indoctrinated in the gas industry.

The two afternoon meetings of the Transmission Committee were presided over by H. J. Carson, committee chairman, and vice-president Northern Natural Gas Co., Omaha. F. A. Hough, executive engineer, Southern Counties Gas

said about having a proper balance of load between cylinders in a multi-cylinder engine, especially where the equipment is operated at full load practically 100 percent of the time."

A brief paper by G. F. Leamon, in charge of pipeline aerial patrol for Northern Natural Gas Co. and Panhandle Eastern Pipe Line Co., Omaha, brought out the following points:

"Ground patrol costs approximate one dollar per mile; air patrol costs are a fraction of that amount; ground checks made by pipeline walkers have verified the efficiency and accuracy of the air patrol, and transmission and pipeline departments are satisfied with the results of aerial patrol.



Caught in conversation between sessions of the forty-second annual meeting of the natural gas industry. Left to right: F. H. Lerch, Jr., New York, N. Y.; T. J. Strickler, Kansas City, Mo.; E. G. Dahlgren, Oklahoma City and F. A. Hough, Los Angeles, Calif.

the possibilities of automatic compressor stations.

3. It can use the gas from the pipeline as fuel which permits the use of low cost energy and eliminates the problem of extra fuel transportation.
4. It does not require water in its cycle of operation.
5. A single unit (or at most two) is capable of producing sufficient power at each compressor station to handle the entire load of a line with 250 million cubic feet a day gas capacity.

"Use of Propane-Air for Shaving Peaks and Partial Standby" was the subject of a paper presented by Al Lauderbaugh, chief engineer, The Manufac-

turers Light and Heat Co., Pittsburgh, with assistance from Carl V. Spangler, J. F. Pritchard and Co., Pittsburgh.

Operation during the past winter of the many LPG-Air plants constructed last year has demonstrated their value for "peak load shaving", Mr. Lauderbaugh remarked. In many cases they exceeded their design rating and were often used in 100 percent substitution for natural gas.

Difficulty in securing the desirable grade LP-gas clearly indicated the wisdom of designing plants to operate with any one of the three gases—propane, isobutane, butane or any combination of the three, he said.

The following average figures from 15

For the same plants, the average total installed cost of storage is \$11,000 per tank of 30,000 gallon water capacity.

These figures can be used to estimate the complete installed cost of any size plant from three MM to 22 MM per day capacity with any amount of pressure storage.

The views of George R. Benz, manager, Chemical Products Department, Phillips Petroleum Co., Bartlesville, Okla., on the supply and demand outlook of LP-gas brought out expectations of the continued growth of that industry in direct proportion to the ability of the petroleum industry to obtain long distance transportation, as well as recovery,

spring and summer should be able to buy at the lowest price.

The Accounting Committee round-table conference on April 30 was the best attended of any natural gas accounting meeting since the organization of the Committee. Many accounting and tax problems peculiar to the natural gas industry were freely discussed. One feature of the meeting which was directed by F. W. Peters, Accounting Committee chairman, Oklahoma Natural Gas Co., Tulsa, was a short paper outlining the general principles of depletion accounting for natural gas companies. Discussions brought out different types of utility plant subject to depletion, methods



Natural Gas Department Managing and Advisory Committee dinner: Left to right around outside of table—G. A. McDonald, J. D. Creveling, H. M. Dow, H. R. Bennett, E. P. Noppel, E. L. Rawlins, J. W. Ferguson, J. W. West, Jr., H. Carl Wolf, J. French Robinson, R. W. Hendee, H. D. Hancock, G. H. Smith, F. H. Lerch, Jr., A. F. Bridge, H. J. Carson, E. F. Schmidt, C. M. Young. Left to right around inside of table—C. H. Zachry, E. Buddrus, A. H. Weyland, E. G. Dablgren, F. W. Peters, F. A. Hough, E. S. Pettyjohn, I. K. Peck, T. J. Strickler

plants constructed during 1946-1947 were listed as indicative of construction cost of LPG-Air plants. However, Mr. Lauderbaugh added, comparisons of plant construction costs are difficult even when rated daily capacity is the same. Each figure, he explained, represents the installed cost of a complete plant operating against 125-pound line pressure, exclusive of storage, in dollars per MM per day capacity of equivalent 1100 B.t.u. natural gas.

Daily Plant Capacity	Cost
Equivalent Natural Gas	Per MM
3 to 7 MM	\$22,000
8 to 12 MM	\$14,500
13 to 17 MM	\$12,800
18 to 22 MM	\$11,200

treating and storing facilities and equipment.

Twenty years ago fewer than ten plants produced LP-gas, Mr. Benz remarked, whereas today there are more than 480 plants engaged in its manufacture in 22 states.

He concluded that prices are expected to increase "as increased demand can only be met by upgrading and diversion of the supply from present uses except, of course, supplies obtained from new oil fields. Any future increases in the price of crude oil will doubtless be reflected in the price of liquefied petroleum gas. Buyers who are in a position to take delivery of their annual requirements or a major portion thereof in the

of depleting these assets under F.P.C. classification and under various state classifications of accounts. The consensus of the group was that one of the most important problems in depletion accounting is the establishment of a correct gas reserve either for the lease or a pool of leases.

Several members from companies actively engaged in drilling programs presented problems on geological, geophysical, and exploratory drilling costs. Delegates were urged to carefully examine all drilling contracts before execution, as the method of contracting for drilling is important in securing the most advantageous Federal tax treatment. (Continued on page 312)

Gas Industry Expanding

**Utilities' billion dollar program has sufficient gas supplies
but faces shortages of transmitting and distributing materials**

GAS utility companies are prepared to spend approximately one billion dollars this year in expanding production, transmission and distribution capacity. Shortages of materials, principally steel, pipe and tin plate, overburdening of the nation's transportation system and delays in obtaining necessary certifications to expand the country's natural gas pipeline systems are seriously obstructing these expansion plans.

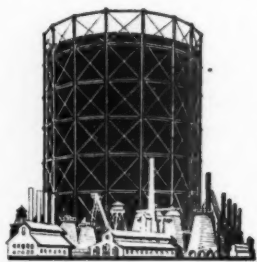
Postwar surveys indicated approximately 41 percent of the people interviewed want gas for house heating. The demand for gas for cooking, refrigeration, air conditioning and automatic water heating is rising steadily. Gas utility companies are employing every possible resource to meet this demand. Production capacity of the industry is being increased. Standby facilities for storing liquefied petroleum gases for mixing with other gases to meet peak loads are being installed. New discoveries of natural gas are far exceeding consumption. *There is no shortage of gas.* The shortages exist in materials required to transmit and distribute gas to prospective customers.

Expansion programs are now going forward as rapidly as materials become available. For example, The Brooklyn Union Gas Co., as part of a \$24 million program has installed two new water gas sets and has three additional water gas sets and a propane air plant under construction. Two new waterless holders will provide storage for meeting peak load demands. Brooklyn Union intends to use natural gas when and if it can be procured to the advantage of the company and its customers.

Boston Consolidated Gas Co. now has under construction two carburetted water gas sets and will install a third set. Its plans include a liquefied petroleum plant and 28 liquefied petroleum storage tanks for standby use. Consolidated Gas Electric Light and Power Co. of Baltimore increased manufacturing capacity eight million cubic feet per day last year and plans an expansion of like amount

this year. It now has a five million cubic foot holder under construction and plans to install an additional holder, two water gas sets, and other production accessories to cost \$5,400,000. Additional gas distribution facilities planned will cost \$8 million over a three year period.

The Ohio Fuel Gas Co., hopes to spent \$5 million in improving its distribution system in 1947 and will spend \$10 million for additional transmission



lines and greater storage capacity. Materials have been ordered for 100 miles of new transmission lines. More than seven billion cubic feet of storage space will be added to present facilities and construction has been started on two propane-air plants.

The Portland (Oregon) Gas & Coke Co. spent \$1,750,000 last year for additional generating, gas main and compressor capacity and liquefied petroleum capacity. More than \$3,250,000 will be spent this year. The South Carolina Power Co. has added a new gas plant at Charleston to pipe a mixture of propane gas into the city's carburetted water gas supply to meet peak load demands.

Additional water gas sets are being installed by the New Haven Gas Light Co. and the Hartford Gas Co., each spending \$2 million for expansions in 1947. The Bridgeport Gas Light Company is to spend \$1.5 million for additional equipment. Long Island Lighting Co. has on order water gas sets, compressors and storage holders for installation this year.

Natural gas pipeline facilities are expanding as rapidly as available materials and regulatory situations permit. Addition of the \$143 million Big and Little Inch lines to the nation's network augments natural gas supplies in the eastern area. The Tennessee Gas & Transmission Co. is planning a 1,000 mile, \$55 million gas line from the Houston area to West Virginia. El Paso Natural Gas Co., Southern California Gas Co. and Southern Counties Gas Co., Los Angeles, are constructing a \$70 million, 1280-mile 30-inch line from Texas to California.

Michigan Consolidated Gas Co. and its subsidiaries will spend more than \$1.5 million this year in gas field facilities, preparatory to construction of the \$52 million Michigan-Wisconsin Pipe Line. Houston Natural Gas Corp. is carrying on an accelerated expansion program and the gas company affiliates of the Amarillo Oil Co. are adding compression facilities and building additional loop-lines, including a new 16-inch pipeline. The Penn-York Natural Gas Corp. and Dominion Natural Gas Co., Ltd., plan to lay 122 miles of 10-inch high pressure main to bring gas from the Appalachian areas.

These are a few of the hundreds of expansion plans of the gas industry. Natural gas reserves are more than adequate. The last report of the Natural Gas Reserves Committee of the American Gas Association placed recoverable reserves of natural gas at 160 trillion cubic feet, a gain of 12 trillion cubic feet over the previous year, against national consumption of about 4.9 trillion cubic feet.

Improvement Indicated

Reports indicate some improvement in the steel situation. Sheet and strip production facilities were increased from 16 million tons to 19 million tons annually during the war, but labor troubles and stoppages reduced production to about 14 million tons in 1946. Maximum production is hoped for this year, but many industries are clamoring for this production.

Because of the difficulties in obtaining supplies and materials, restrictions on new gas services became necessary in some areas for the protection of existing gas customers. As the materials situation improves these restrictions will progressively be lifted.

Problems of the House Heating Load

The perplexities involved in selling gas for heating homes carefully analyzed with particular attention to contributing factors in different sections of the country



Irving K. Peck

THE househeating load is one of the most perplexing problems confronting gas companies today.

The American public has with almost abrupt enthusiasm discovered the superiority, convenience and economy of gas for househeating, and in its rush to take advantage of this discovery our facilities have been inadequate to meet the demand. This is a very happy situation which, unfortunately, presents a number of unhappy problems.

BY IRVING K. PECK

*Vice-President and General Manager,
The Manufacturers Light and Heat Co.,
Pittsburgh*

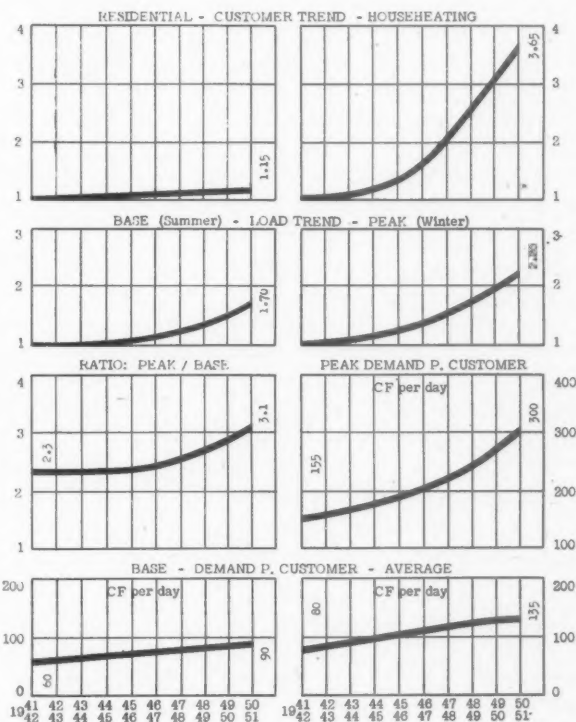
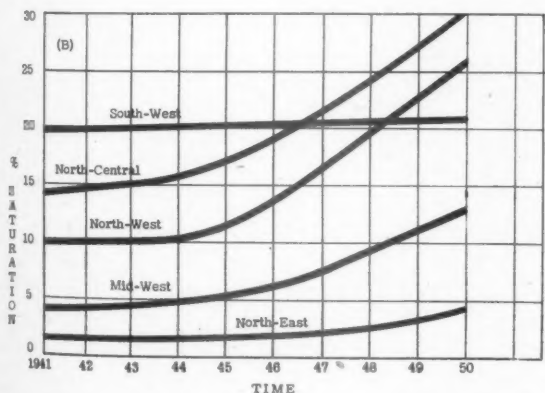
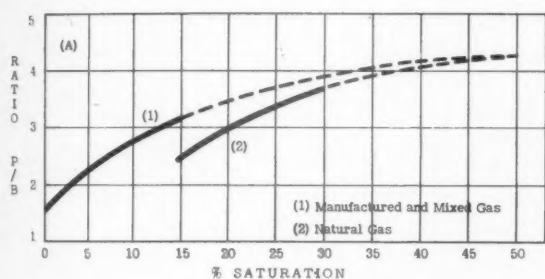
Of course, this inadequacy is no fault of the companies, but is the result of what now must be an Old Wives Tale to everyone involved—extreme shortages of prime materials and equipment, regulatory measures, not to mention the unusual series of recurrent cold waves last winter—and so on.

While many companies are faced with identical contributing factors to the current gas situation, and although the

problems of the househeating business are common to most companies, the solutions will have to be worked out individually by each company.

This summarization of some of the househeating load problems is based upon returns from questionnaires sent to selected gas companies with operating conditions considered typical of those found throughout the northern United States.

A great many gas companies across the nation invested large amounts of time and money over a period of many years in an effort to develop a profitable househeating business. They all reached a certain respective saturation on January 1, 1946.



MID-WEST SECTION: (left)—In general, mixed gas some with manufactured gas, 520-1000 B.t.u. . . . Peaks handled by water gas with some LP and oil gas. . . . No gas allowed for house heating. . . . From 0-100 percent new homes gas-heated. . . . 10-70 percent conversion burners. . . . Gas heat cheaper or equal to oil, more or equally expensive as coal. HOUSE HEATING TREND (right): (A) Ratio—peak demand to base demand versus percentage of saturation versus time. (B) Represents percentage of saturation versus time

Then in 1946 and in the early portion of 1947, these gas companies acquired more househeating business than they had installed in all their experience up to that time. In fact, many companies have taken on or have been forced to acquire, more househeating business, and at a faster rate, than they economically, efficiently or properly have been able to handle.

Roper Survey

The Roper Survey indicated that more than 41 percent of the people contacted in different parts of the country now prefer gas for househeating over all other fuels. The past 12 to 16 months have made the authenticity of this survey glaringly apparent.

Naturally, this great trend toward gas-for-heating has sharply increased peak load demands. Last winter for example, many companies could neither make nor purchase sufficient gas to keep pace with the tremendous winter heating demand.

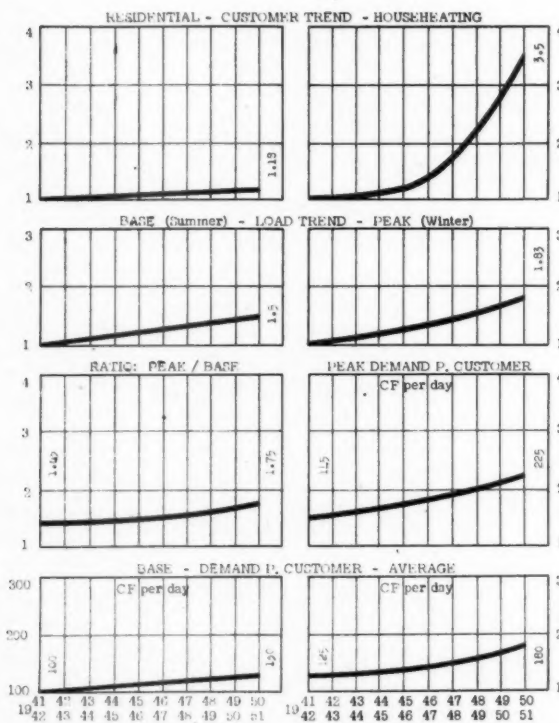
Where companies did have enough gas, either by purchase or production, many were lacking sufficient transmission or compressor station capacity to supply their outlying customers . . . or had insufficient distribution capacity in parts or throughout all of their system. This story has by now become almost a part of American folklore. If it hasn't, it certainly should be, for enough people, both on the supplying and the receiving ends, did nothing for many months but talk about the "shortages."

One of the most serious difficulties encountered by numerous companies this past winter was the creation of peak days so large as to require industrial curtailment. In order to save the domestic load on such days, it was necessary to curtail industrial business quickly, almost without advance warning. Often this happened with painful frequency and for periods of considerable length.

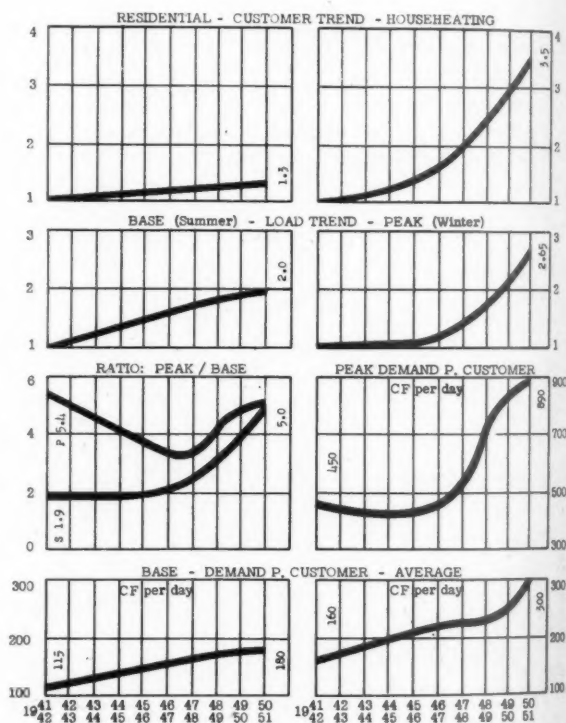
Our problem here is obvious. The industrial customer is a very valuable adjunct to a majority of gas companies. Al-

though sold generally at a cheaper rate than househeating, the industrial gas business is relatively uniform and one which all companies need and like to have. But how to solve this problem under present conditions? If it is going to be necessary in the future to curtail industry during the winter on every cold day, arrangements must be made with such customers far enough in advance for them to meet their own peaks in one way or another. Some gas companies which are experiencing and will continue to experience high peak load to summer day ratios, will perhaps want to serve at least some industrial business on an off-peak basis during the summer to fill up the valley, or they will have to plan on taking industrial business solely with the intent to curtail it on winter peak days.

Generally speaking, most natural gas companies have a very large percentage of industrial business. This is noticeable when reference is made to the accompanying charts. In the North-East Sec-



NORTH-EAST SECTION—Manufactured gas, 500-537 B.t.u. . . . Peaks handled by water gas with some LP-gas. . . . In general, no or little househeating restriction. . . . From 1-95 percent new homes gas-heated. . . . 10-90 percent conversion burners. . . . Gas heat more expensive than oil and coal



NORTH-WEST SECTION—Manufactured gas, 500-570 B.t.u. . . . Peaks handled by water gas, oil gas and LP-gas with some industrial curtailment. . . . Some househeating restriction. . . . From 60-70 percent new homes gas-heated. . . . From 10-70 percent conversion burners used

tion of the country we see that the summer day average demand will be about 110 cubic feet per day per customer of 530 B.t.u. gas. However, in the North-Central Section, where natural gas is served, 275 cubic feet of 1050 B.t.u. gas is used per day per customer. This is about five times the gas consumption per customer during the summer on the part of the natural gas company as compared to a manufactured gas company. This is the result of very large industrial sales of natural gas.

Some natural gas companies already have a very high percentage of industrial gas load as much as 50 percent. These same gas companies even have as much as 50 percent saturation in househeating. When this situation occurs, we find peak day ratios to summer day of three or four to one, even with a heavy curtailment of industrial business.

The ratio of peak day demand to summer day demand increases quite rapidly with an increase in the saturation of

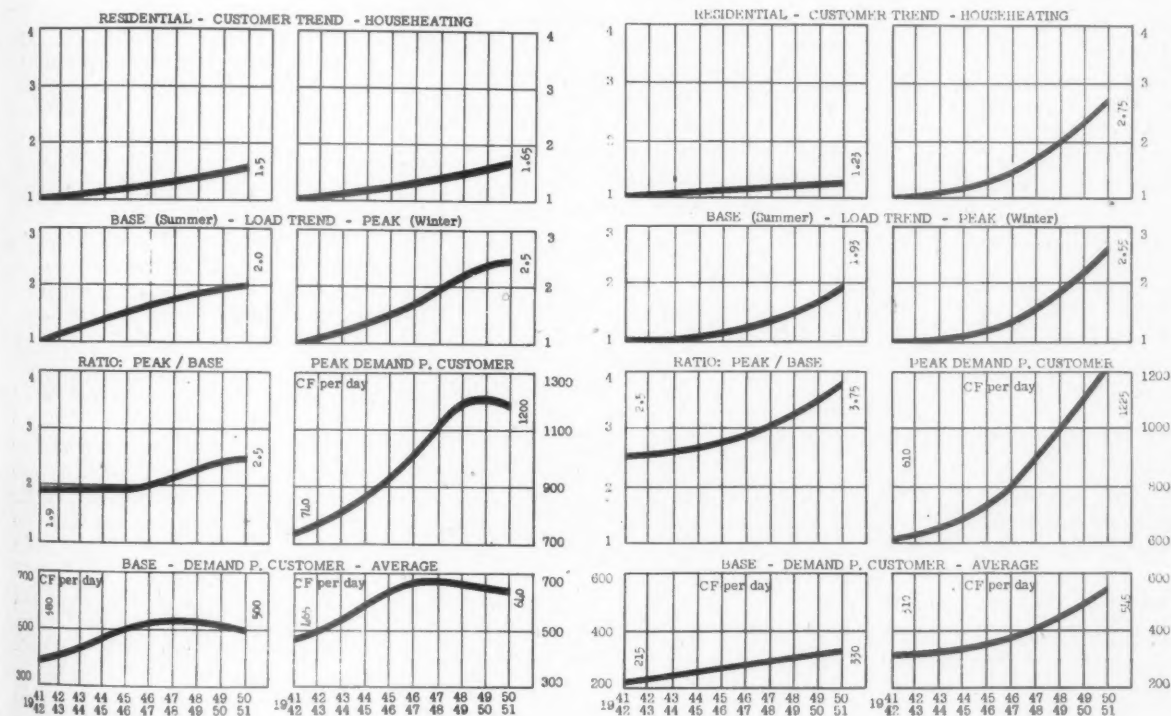
house-heating. This will be noticed by reference to the accompanying charts. This in some cases is handled through large pipelines at not too great an expense. However, it is noticeable that most of the later pipeline contracts must of necessity obtain rather high demand charges and probably, as time goes on, these demand charges will become quite a material factor. Because of this, a company supplied all or in part from pipelines and intending to take on a large amount of househeating, must realize that it will either have to stand high demand costs or make provision for peak shaving through the supply of additional gas on most of the winter peak days. Just so, the manufactured (and mixed) gas company must make provision for additional peak generating equipment.

Those companies which have the present lowest percentage of househeating are to be found among the manufactured gas group. Those having a higher percentage are the mixed gas companies,

with a much higher percentage left to the natural gas companies, and the highest percentage of all, of course, found among the larger natural gas companies with accompanying low rates.

National Groupings

From the survey, it is not difficult to divide the different gas companies into national groupings. For example, the northeastern part of the United States is chiefly a manufactured gas section, comprising New England, Massachusetts, Connecticut, Rhode Island, New Jersey, Delaware, Maryland, and northern New York. Companies in this territory consider that they are doing well on house heating if their saturation is as high as 3.5 percent. However, these same companies are expecting an increase to between seven and ten percent within the next ten years. If natural gas comes into the New England area, the companies' expectation there will be for a faster



SOUTH-WEST SECTION—Natural gas, 1050 B.t.u. . . . Peaks handled by oil gas, LP-gas, gas wells and some industrial curtailment. . . . No restriction on househeating. . . . About 20 percent of new homes gas-heated. . . . No conversion burners. . . . Gas heat cheaper than oil or coal

NORTH-CENTRAL SECTION—In general, natural gas, 1000-1100 B.t.u. . . . Peaks handled by using wells, underground storage, LP-gas, water gas and industrial curtailment. . . . Gas heating allowed for new building and hardship cases, no conversion from other fuels. . . . 65-95 percent new homes gas-heated. 10-90 percent conversion burners. . . . Gas heat cheaper than oil, equal to coal

Gas Range Campaign

WITH the theme "Gas Has Got It," one of the hardest hitting integrated promotion and advertising programs ever sponsored by the gas industry will be launched after Labor Day under the auspices of the American Gas Association. The campaign will feature automatic gas ranges built to "CP" standards. It is expected to result in the appearance of approximately 98 million gas messages in national magazines in three months, more than double the number the public received during the same period of 1946.

Findings revealed by the recently completed Elmo Roper public opinion poll of the industry will serve as a basic art and copy platform for the intensified new drive. Special portfolios will be issued to gas companies, manufacturers and dealers suggesting ways and means

of expanding the impact of the national drive on a local basis so that millions of persons will become familiar with the advantages of the modern automatic gas ranges of today.



Advertisements included in the campaign will appear not only in one color but sometimes in less than full-page size, thus enabling many more insertions. It is hoped that local utilities will run at least one good-sized newspaper advertisement each of the three months, following as closely as possible the appearance and theme of the national advertisements.

These combined "shock attacks" together with local gas company reiterations of the "New" angle in their radio programs, car cards, truck panels, envelope enclosures, outdoor bulletins, etc., are expected to develop in the public a vitally important positive acceptance of new gas ranges.

saturation rate and a greater ultimate percentage.

The companies in the metropolitan New York area now have the largest househeating saturation of the North-East Section, running as high as seven percent. The largest proportion of new homes being constructed in the East are in that area and most of them are designed for automatic gas heat.

Just to the West, lies the natural gas area comprising Western Pennsylvania, Southern New York, Ohio, West Virginia and Michigan, all of which may be called the North-Central Section. The saturation of househeating in this area will average about 16 percent, and the expectation is toward 50 to 60 percent in the course of the next decade. Even now, some gas systems have very large

saturations, running from 25 to more than 50 percent. Those individual companies reporting saturations as large as 40 to 50 percent, are expecting a rise to 60 or even 75 percent within the next few years.

The Middle-West Section is pretty much a mixed gas area and includes Indiana, Illinois, Wisconsin, Minnesota, Iowa, and as far westward as Montana. Here the present saturation is from four to ten percent on the average, with the expectation over a decade of from 20 to 25 percent. A few of these companies have taken on a real substantial amount of househeating within the last year and a half, and their loads have climbed at very rapid rates. For example, some of the companies in Minnesota have saturations as high as 40 percent and fully expect to have as much as 75 to 80 percent in the very near future.

North-West Section

The North-West Section of this country is predominately supplied with manufactured gas. We find in northern California, Oregon and Washington, the househeating saturation runs from 15 to 20 percent currently, with 35 percent the future expectation.

Southern California is chiefly a straight natural gas area. Here, most of the homes are heated with gas floor furnaces or miscellaneous gas-fired space heating equipment.

There has been and is still quite a demand on the part of numerous manufactured and mixed gas companies to install so-called LP-gas plants. It must be considered here that present-day costs are high, as compared to costs of some years ago, and that the relative cost of the liquid varies considerably. In New England the liquid cost of propane or butane does not increase the price of gas appreciably above normal. While, on the other hand, elsewhere in the nation because of transportation charges and a low natural gas rate, the cost of peak load LP-gas is considerably above that of natural gas.

Added to this is the additional problem of supply when this type of bolstering fuel is most urgently needed. Many of the LP contracts now being signed allow delivery of but 1.5 times as much liquid during the winter months as is allowable for delivery during the summer. This does not permit many total days' opera-

Househeating Load Statistics	Househeating Percent Saturation			Ratio: Average Day Peak Day			Ratio: Peak Day Summer Day			Present Demand per Customer C.F. per Day at Btu.			
	1941	1947	1950	1941	1947	1950	1941	1947	1950	Summer	Peak	Average	Btu.
North-East Section													
Company A	0.90	1.80	3.50	0.72	0.57	0.54	1.52	1.95	2.08	134	262	148	528
B	0.90	5.80	—	0.68	0.44	—	2.15	3.10	—	116	370	162	530
C	1.19	3.44	4.03	0.75	0.59	0.63	1.48	2.04	2.05	112	229	136	530
D	1.15	3.22	5.12	0.68	0.60	0.49	1.88	2.10	2.50	129	273	164	520
E	2.10	3.10	4.00	0.67	0.61	0.52	2.02	2.09	2.38	118	247	149	537
F	1.10	1.00	—	0.73	0.72	—	1.60	1.54	—	109	168	122	510
G	1.00	1.90	3.70	0.75	0.67	0.58	1.60	1.80	2.20	131	237	159	530
H	1.50	2.40	4.50	0.58	0.52	0.46	2.14	2.31	3.24	109	252	131	525
I	2.80	3.40	4.60	0.64	0.51	0.49	2.05	2.40	2.62	167	400	204	500
J	0.22	0.86	6.15	0.77	0.61	0.75	1.38	1.70	1.62	141	240	146	525
K	0.78	4.30	7.40	0.70	0.45	0.53	1.33	2.08	2.40	154	320	145	525
L	3.86	6.30	10.00	0.54	0.44	0.45	2.33	2.95	3.33	85	252	111	537
M	0.90	1.60	2.81	0.68	0.55	0.45	1.92	2.40	3.28	90	214	119	537
N	4.00	7.00	13.00	0.62	0.40	0.24	2.69	3.88	5.41	113	437	177	537
O	2.00	4.30	8.20	0.65	0.45	0.41	1.73	2.54	4.04	111	282	128	537
North-Central Section													
Company A	7.25	15.90	22.50	0.50	0.38	0.36	3.00	4.10	4.00	175	712	274	1000
B	10.00	15.70	23.00	0.47	0.37	0.36	3.60	4.40	4.70	197	862	320	1020
C	9.50	16.10	29.90	0.53	0.49	0.37	3.38	4.06	4.83	128	518	206	1000
D	8.40	15.50	19.60	0.52	0.50	0.68	2.86	2.55	1.98	174	444	223	1000
E	7.30	15.60	14.60	0.68	0.44	0.48	2.28	3.18	3.52	140	443	195	1000
F	55.00	56.00	57.00	0.44	0.41	0.37	4.09	3.55	4.21	410	1460	592	1100
G	14.00	24.00	34.00	0.45	0.38	0.38	3.00	3.00	4.00	445	1320	591	1050
H	15.00	31.00	38.00	0.54	0.43	0.45	2.60	3.50	3.80	276	975	414	1100
I	9.80	15.90	26.40	0.48	0.38	0.33	3.56	4.18	5.87	158	657	252	1050
J	3.21	7.73	20.50	0.51	0.47	0.49	2.57	2.74	3.86	421	1160	547	1030
K	7.60	16.90	44.00	0.55	0.39	0.39	3.21	3.64	7.83	238	865	336	850
L	7.80	13.30	27.40	0.51	0.52	0.42	2.57	2.42	3.26	476	1155	600	1100
M	3.80	10.70	19.20	0.55	0.39	0.45	2.64	4.03	5.33	102	412	160	875
N	5.70	8.50	—	0.50	0.41	—	2.98	3.06	—	373	1138	465	1130
Mid-West Section													
Company A	4.70	10.33	—	0.58	0.44	—	2.42	3.36	—	135	454	198	600
B	3.60	10.10	15.00	0.61	0.55	0.71	2.10	2.68	3.54	116	290	161	700 & 1000
C	2.57	4.79	5.15	0.67	0.55	—	1.93	2.36	—	154	361	198	520
D	13.90	38.40	51.40	0.50	0.45	0.35	3.80	5.35	7.50	123	657	303	800
E	2.00	6.00	9.00	0.62	0.40	0.41	2.30	3.70	4.40	77	287	115	800
F	2.00	3.00	6.00	0.63	0.53	0.51	2.00	2.20	2.50	121	267	141	800
G	42.80	47.40	57.10	0.40	0.43	0.50	2.87	3.20	2.24	867	2770	1181	875
H	1.36	3.98	4.83	0.71	0.56	0.59	1.58	2.11	2.00	138	291	163	520
I	1.50	5.67	13.72	0.66	0.48	0.43	1.81	2.62	2.36	157	413	200	570
J	1.60	6.90	16.10	0.65	0.48	0.35	1.80	2.50	3.90	1395	3530	1170	570 & 1000
K	22.00	40.00	41.00	0.38	0.49	0.50	2.72	3.57	3.90	540	1930	953	1000
North-West Section													
Company A	10.90	19.40	25.80	0.27	0.47	0.34	5.30	3.40	5.20	159	535	250	570
B	8.00	9.10	25.80	0.66	0.54	0.33	1.88	2.53	4.77	194	491	267	500
South-West Section													
Company A	100.00	100.00	100.00	0.49	0.57	0.47	2.41	2.13	2.58	427	910	518	1100
B	19.70	20.40	21.60	0.63	0.59	0.53	1.95	2.16	2.40	516	1120	660	1050

tion, but does require a large amount of storage capacity.

In the operation of peak load LP-gas plants, consideration must be given to the number of hours and equivalent days such equipment is expected to be operated. If companies are to take on more and more househeating, not only will this increase peaks, but also will increase the number of days on which minor peaks occur. It may be found that such LP-gas equipment will have to be operated on all or parts of a great many winter days.

Many natural gas companies today have insufficient underground storage to adequately meet wintertime peaks. Or if there is a sufficient underground storage area or volume, it has not been possible for these companies to obtain the gas to fill these reservoirs as fully as desired.

Underground storage is relatively cheap in direct operating costs. It has a high winter day deliverability when operated under high pressures. However, in most cases, a very large amount of original or cushion gas must be held in

these reservoirs. The relative turnover during the winter season is actually small when compared with the total amount of gas placed in storage.

This raises materially the total cost of storage operation for peak purposes through adding to the original investment the justifiable carrying charges of the large amount of gas constantly held in reserve.

Key Problem

This brings us to the key problem of all—the economics of selling gas for heating homes. It should be noted that as our peaks increase and we use up our plant, transmission and distribution capacities, it is the pre-war-low-cost capacities to which we refer. These must now be replaced and increased by much more expensive equipment. Ultimately this has to be reflected in our rates. Many gas companies are today selling househeating gas much too cheaply as against comparable costs of other fuels. This is so because present rate-steps were set up

before the war when oil and coal were much lower in price.

The whole problem is further complicated by the experience of last year when considerable difficulty was encountered which to some extent is still continuing, in the improper installation of househeating equipment with its resulting hazards. Some companies have found a very high percentage of conversion burners being improperly installed. The American Gas Association Laboratories have been giving much attention to the proper construction, operation and installation of conversion burners, and material on this subject is now available. A great many new manufacturers of conversion burners, a proportion of them to some extent fly-by-night outfits, sprang up during the war. At present there are still about 74 different makes in existence. The problem here is that when the utilities are called upon to service installations of so many makes, so many different kinds of parts, it is difficult, if not impossible, to render proper service.

With the (Continued on page 312)

You Too May Win An Oscar

New program provides for annual recognition of individual leadership in the gas industry by means of six major awards

LEADERSHIP in the gas industry gets an added boost with the adoption of a new program of awards by the American Gas Association Executive Board on April 28 following recommendations of the Committee on Association Awards headed by Walter C. Beckjord, chairman. Individual achievement will be recognized annually in six major awards, one more than last year, and the terms of some of the long-established awards have been liberalized to provide added incentives.

In making its recommendations the awards committee pointed out that "many other fields or activities worthy of recognition are not covered by the present awards." Consequently the committee recommended that the titles of major awards be made to indicate the fields covered, thus making evident those fields and the activities which might well become the subject of additional awards in the future. It was suggested that the name of the sponsor could follow the award title.

The six awards set up under the new program are as follows:

Munroe Award Changed

The industry's most coveted honor, the Charles A. Munroe Award, has been re-named the American Gas Association Distinguished Service Award. It is made annually to the individual who has made the most outstanding contribution toward the advancement of the gas industry.

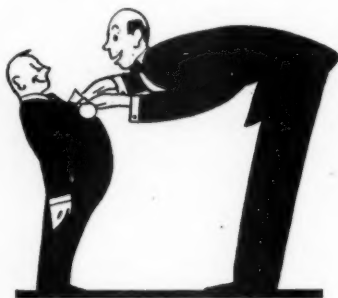
In the past this award has covered a widely diversified field of accomplishment. It has been bestowed for contributions in refrigeration, labor-saving, accounting, rate making, dealer coopera-

tion, sales expansion, research, system changeovers, public relations, scientific developments in gas measurement, promotion of national advertising, and many other fields of endeavor.

The awards committee is urging all companies to submit their candidates for this award which consists of an engraved certificate and a substantial cash payment. Applications for this year's award may be submitted to the Association any time before August 1, 1947. The donor is Charles A. Munroe, an A. G. A. past-president.

Meritorious Service Award

This award for heroic action continues as in the past to be the industry's highest life-saving recognition. It consists of a gold medal, button and certificate and is presented to the individual who has performed the most meritorious act in the gas industry each year beginning July 1 and ending June 30. Applications



must be filed on or before August 1 on a form provided by the Association.

The winner of this honor must have shown conspicuous judgment, intelligence or bravery in saving human life either in the plant or works of any gas undertaking or having to do with the handling of materials of manufacture or of the products manufactured or distributed.

The award was made possible through the generosity of the late Walter R. Adicks, senior vice-president of the Consolidated Gas Co. of New York.

Beal Medal

No change has been made in the name or basis for making this award, which is the highest technical recognition in the industry. Originated by the late W. R. Beal and carried on by the Beal family, it is presented to the author

of the best technical paper presented at a meeting of the Association during the year commencing July 1 and ending June 30.

The award consists of a bronze medal and financial recognition.

McCarter Medals

The widely-recognized McCarter Medals will continue as before to be awarded to individuals throughout the year for outstanding acts of life-saving by application of the prone pressure method of resuscitation. Sponsored by Thomas N. McCarter, chairman of the board, Public Service Electric and Gas Co., these medals, together with certificates of assistance, are presented upon recommendation of the Accident Prevention Committee and approval of the Executive Board.

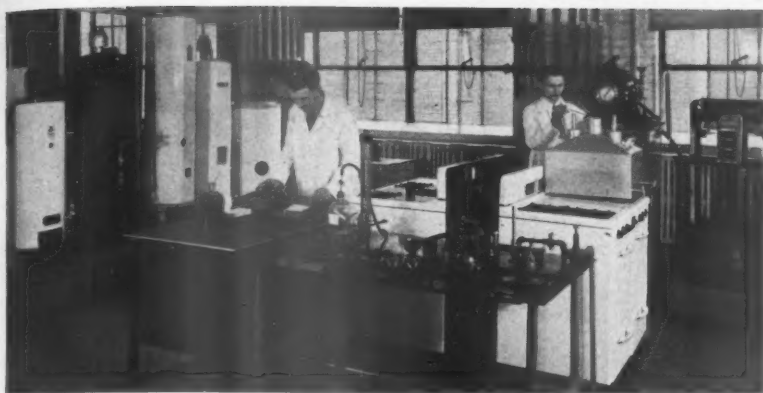
McCall Award Revised

By recent agreement the McCall's Home Service Award is now offered under completely revised and liberalized terms as the A. G. A. Home Service Achievement Award, sponsored by McCall's Magazine. The new regulations provide equal opportunity for individual recognition and company awards, regardless of size. Cash prizes totalling \$1,000 will be made annually in five equal awards which will be presented at the annual convention. (See Page 236, May A. G. A. MONTHLY.)

New Heating Award

As outlined in the May MONTHLY (page 235) a completely new annual contest known as the A. G. A. Gas Heating Progress Award has been set up under the sponsorship of the Corroaire Heater Corporation. The latter firm has donated \$5,000 for a series of five annual awards of \$1,000 each to be awarded to the individuals making the greatest contribution toward the advancement of gas heating. First prize is \$500; second, \$250; third, \$150; fourth, \$50; and fifth, \$50.

Purpose of the award is to give public recognition to those individuals who have done most to create, maintain and increase consumer demand for gas heating. Initial awards in this annual contest will be made to those individuals who have made the greatest contribution during the period from July 1, 1946 to June 30, 1947.



Control appliances and pilot burners used in studying mixing of gases

Mixed Gas Research

Intensified studies on method of establishing interchangeability limits are being extended to cover manufactured gases

BY JOAN HUCK

*American Gas Association
Testing Laboratories*

IN the blending of fuel gases to meet demands for modern gas service is to be found a technological theme the advancement of which offers great possibilities for effecting economies in production as well as meeting peak load demands.

Since this is just as true in the manufactured gas industry if not more so than in the natural gas branch, intensified research studies concerning the interchangeability of other fuel gases with natural gases, completed at the Testing Laboratories last year, are being extended to cover manufactured gases.

Objectives Outlined

Objectives of the investigation include the development of (1) reliable equations for determining interchangeability of other fuel gases with manufactured gases, (2) a simplified and accurate method of gas analysis which will allow application of interchangeability equations, (3) other methods with which factors used in interchangeability equations may be obtained directly without

using gas analyses, and (4) a flame characteristic indicator for providing a visual means of maintaining desired characteristics in the send-out gas.

Importance of securing basic information on blending of gases and its effects on operation of domestic gas appliances was first recognized by the American Gas Association in 1926. An extensive research study investigating the blending of manufactured and mixed gases of heating values less than 700 B.t.u. was consequently undertaken. As a result of this study, an empirical equation well known today as the so-called "C" factor, was developed and reported in Laboratories Report Number 689, *Mixed Gas Research*. It defined acceptable limits for interchangeability of manufactured and mixed gases of heating values less than 700 B.t.u.

After publication of this report a number of utilities used the empirical equation to determine interchangeability limits of gases which they propose to distribute. Some reported good agreement between the calculated limits and the operation of appliances while others found that they could operate somewhat outside these limits without excessive complaints.

As the number of companies serving natural gas for normal sendout in-

creased, the necessity of having a suitable standby gas available for peak load demands became increasingly important. Since the "C" factor equation did not take into consideration all factors affecting interchangeability of higher heating value gases it became apparent that with these gases the three fundamental combustion characteristics, namely, lifting, flash-back, and yellow tips, should be considered separately rather than evaluated with a single index.

Research Advanced

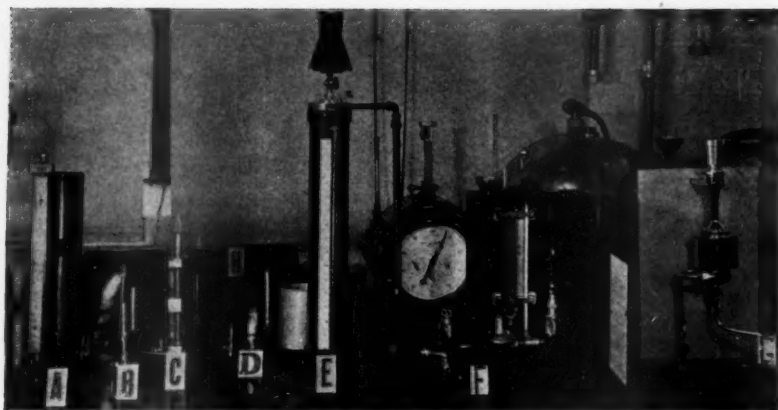
Recognizing the need of research in the natural gas field as a problem of major importance to the advancement of the industry, a Joint Committee of the Natural Gas Department and the Technical Section was appointed in 1943 to direct such a study. Its results together with the derivation and application of mathematical equations for establishing interchangeability limits for lifting, flash-back, and yellow tips with natural gas employed as the adjustment gas, are presented in Research Bulletin Number 36, released in February, 1946.

Realizing the importance of the subject and the further need for research on gases of lower heating values, the Gas Production Research Committee initiated and assigned the present study to the Laboratories. A Technical Advisory Subcommittee of experts particularly interested and qualified was appointed to supervise it directly. Members of this committee are: J. F. Anthes, The Brooklyn Union Gas Co., chairman; W. E. Churchill, Boston Consolidated Gas Co.; W. R. Fraser, Michigan Consolidated Gas Co.; S. S. Tomkins, Consolidated Edison Co. of New York, Inc.; F. E. Vandaveer, The East Ohio Gas Co.; and C. C. Winterstein, The Philadelphia Gas Works Company.

Two Phases Completed

The project was organized under three separate phases, two of which have been completed. These consisted of a desk study and a field survey which together set the stage for the third and major phase, devoted to experimental work with appliances and test burners. This is now in progress.

The desk study sought to correlate indices of interchangeability developed in the natural gas studies with the perform-



Flame characteristic test burners used in mixed gas studies

ance of substitute gases experimentally determined in the first mixed gas research investigation. The advisory committee, after reviewing results of the first part of this study, agreed that it would be more expedient to concentrate on bringing experimental work with appliances and test burners up to date and to attempt to correlate these new data with last year's work.

Field Survey

The field survey, covering eight representative manufactured gas companies, was made to obtain general information relative to production and mixing, including actual operating distribution and utilization problems encountered, in order that the experimental work would be of maximum value in the field. Much attention was devoted to methods em-

ployed for analyzing gases as a background for that portion of the study directed toward simplification of such methods or, if possible, elimination of the necessity of using gas analysis in calculations. Various test burners were also taken into the field and used to note burner operating characteristics and quality of gases supplied.

In preparation for experimental work, a miniature blue gas generator and carburetor were designed and constructed for production of carburetted water gases, blue gases, oil gases, and blow-run gases needed in the investigation. It is felt that the production of these gases in this way will more closely approximate field conditions than did their synthesizing in the manner used in past studies. Generally speaking, gases of 800 B.t.u. heating value and below are to be utilized.



Blue gas generator and carburetor used for producing various types of manufactured gases

In initial experiments 535 B.t.u. commercial propane-air have been mixed with coke oven gas to determine the degree of substitution possible.

Control appliances for experiments have been carefully chosen to represent as far as possible the wide variety of equipment found in the field. Ranges, automatic storage water heaters, an attachable water heater unit, a vented circulator, a radiant heater and a refrigerator unit are being employed. In addition, several miscellaneous appliance and pilot burners have been included in the test assembly. Included are a conversion burner, refrigerator burner, impinging type jet burner, luminous flame water heater burner, star-shaped range top burner, automatic safety pilots, automatic ignition system for oven burners, and a push-button type lighter.

Likewise a variety of test burners for determining flame characteristics are to be used in the work, including several constructed for the purpose. They are a most important part of the assembly, one of the objectives being the development of a visual means of controlling the limits of mixing gases, thereby maintaining desired burning characteristics in the send-out gas.

Correlation Planned

It is planned to correlate the new study with and develop it somewhat along the same lines as that of the natural gas study. That work was unique in that it provided a practical means of evaluating gases without necessity of having a complete knowledge of the underlying work theory and its many details. Results were presented in "handbook" form and steps involved in calculation of the interchangeability equations outlined in such a way that anyone having analyses of the base and supplemental gases under consideration may determine the three limits of performance in a comparatively short time. The limits so established will allow a decision regarding the suitability of the gas for interchangeability purposes. Gas interchangeability calculation sheets with which interchangeability indices could be quickly obtained were outlined for the convenience of the user. The value of the information presented in Research Bulletin Number 36 is well demonstrated by the wide distribution of the publication among engineers and operators.



Your Card, Sir!

FIRST came the business card bearing the nationally advertised domestic gas slogan, "Gas—The Wonder Flame That Cools As Well As Heats." These cards are being used by gas companies the country over.

Now comes the business card carrying the nationally advertised industrial and commercial gas slogan—"More and More The Trend Is To Gas."

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Please address all inquiries to Relief Printing Corp., 87 Summer Street, Boston 10, Mass.

Highlights of Gas Rate Situation

Review of regulatory and economic history outlines problems and trends and suggests actions needed by gas industry to better meet changing economic conditions



C. F. de Mey

REGULATION of rates today—particularly Federal—is perhaps more perplexing and restrictive than ever. Rate determination based on present property value is under great pressure because of the progress the

Federal Power Commission has made with its "original cost-depreciated" basis, or the Supreme Court's "no base" pronouncements. Straight line depreciation now appears to be practically the industry standard forced on our companies with passive assent from the courts. It should surprise no one that if present trends continue, future earnings will probably be relatively less on the whole than in the past. This trend must be stopped or diverted and I do not think it is too late to do something about it.

On the whole regulation seems less subject to political considerations today than in the past, state and federal commission staffs are stronger and more competent and generally are making an earnest effort to do a fair and conscientious job within the limits of the rules, regulations and formulae under which they operate.

Some gas companies are temporarily experiencing high earnings, both gross and net, while others, in spite of increased sales are barely making their way on the long view. Much new investment is required to meet our customers' requirements and strenuous efforts are being made to obtain the necessary material and equipment. Millions of dollars are being spent currently and future expenditures seem necessary if the estimated requirements of our markets are to be adequately supplied. Much of this activity is caused by a surprising demand for residential house heating with consequent low load factor use of the new facilities. Unless adequate earnings are

BY C. F. DE MEY

Vice-president, Columbia Engineering Corp., Columbus, Ohio, Past-chairman and Member A. G. A. Rate Committee

assured, it will eventually be most difficult to obtain the financing necessary for these capital expenditures.

Present rate structures with few exceptions are of pre-war vintage and pre-war in their market coverage. House heating was a luxury then which required some stimulation through incremental rate levels. Rising costs have by now in many instances reached levels where such incremental rates are no longer able to support the necessary investment in facilities and with the unprecedented demands for heating service this business has become an important and basic part of our service.

Underlying Causes

Aside from the influence of the two World Wars—how has this situation arisen? Have we been remiss in our managerial responsibilities? Have our rate engineers listened to the salesmen's siren song and discarded basic principles for the low subjective viewpoint that the bird in hand is worth more?

To some extent the answer is yes to these questions. Management has had to defer to political pressure and rate engineers have with some reason devised rates fitted to temporary depression conditions. In such cases overwhelming argument came into play and such things were done, but with some misgivings. Today we should look back on those pre-war years as an experience from which much can be learned for our guidance from now on.

As regards the future of regulation we can with considerable profit first review some high spots of history.

From the earliest days regulation of businesses affecting the public interest has had as its cornerstone the principle that the payment for the commodity sold

or the service rendered must be *just and reasonable*. In applying this test both the interests of those engaged in the business and those served by it must be equally considered.

For many years of regulatory history there was no attempt to determine the justness and reasonableness of charges for public service through a mathematical formula. Rather the adjudication of this question was determined by the judgment and good sense of the court before which it came. However, with the growth and expansion of public service as an industry political pressure too often resulted in the attempt to fix abnormally low rates. This was the inevitable result of the unnatural situation in our business, in which the *buyer* through a political representative sets the price of the commodity or service.

With the development of the concept that a regulated rate might be confiscatory and therefore violate the Fourteenth Amendment, there arose a necessity for



Rate situation is perplexing

some basis by which rates could be tested as to their constitutionality. There emerged the doctrine that the test of rates should be as to whether they resulted in a fair return on the fair value of the property used and useful in the business. *Smyth vs Ames* and similar cases were efforts to set forth and define the fair value principle. For a long period prior to the Supreme Court deci-

sions in the Natural Gas Pipe Line and Hope cases, the participants in a rate case were principally concerned with the establishment of the fair value of the property as a rate base and of the proper rate of return thereon. When the Natural Gas Pipe Line case came before the Supreme Court it said:

"The Constitution does not bind rate making bodies to the service of any single formula or combination of formulae. Agencies to whom this legislative power has been delegated are free, within the ambit of their statutory authority, to make pragmatic adjustments which may be called for by particular circumstances. . . ."

Soon thereafter in the Hope case the Court's opinion amplified its views as to the propriety of testing by viewing the overall result. The Court said:

"Congress however has provided no formula by which the just and reasonable rate is to be determined."

"Rate making is indeed but one species of price fixing."

"Nor is it important to this case to determine the various permissible ways in which any rate base on which the return is computed might be arrived at."

"It does however, indicate that 'fair value' is the end-product of rate making, not the starting point. . . ."

Considerations Noted

Without quoting further, it may be stated that the considerations pointed out in the decision were:

- A—The fixing of just and reasonable rates involves a balancing of the investor and consumer interests.
- B—Regulation does not insure that the business shall produce net revenues.
- C—From the investor or company viewpoint, revenue should be sufficient to cover operating costs and capital costs including service on the debt and dividends on the stock.
- D—The return to the owner should be commensurate with return on investments in other businesses of corresponding risks and should be sufficient to insure confidence in the integrity of the enterprise so as to maintain its credit and attract necessary new capital.

Thus, while the Court did not in the Hope decision approve the Commis-

sions' use of depreciated original cost as rate base, in fact implying that the use of any rate base is not required, it did not give any specific test of justness and reasonableness. Rather it returned to the old doctrine that the final determination rested upon the judgment of the reviewing court.

Justice Jackson in a concurring opinion in a later case said:

"It is difficult for me in these cases, and in some it might be impossible, to follow the rule of Hope in reaching a decision. I have no intuitive knowledge as to whether a given price is reasonable. . . ."

Committee Reports

In the "Report of the Committee on Rates of Public Utilities" of the NARUC for 1946, after citing the Court's statement concerning "the various permissible ways in which any rate base might be arrived at, it was stated:

"Certainly the foregoing affords no satisfactory or adequate answer to the questions of 'What or Why is a Rate Base,' and later:

"It may be fairly argued that the decision of the court in the case and the essential basis of that decision does not relegate 'fair return on fair value' to the discard as a formula for use in the process of rate making. . . . The majority opinion in saying if 'the total effect of the order cannot be said to be unjust and unreasonable, judicial inquiry under the Act is at an end' was really saying nothing at all."

This paper can attempt to outline only the very broadest aspects of this subject. During this period, many other policies of the FPC relating to determination of original cost, jurisdiction, extensions of service, etc. have been outlined in its orders, opinions and decisions. The state commissions have been similarly engaged although not always in sympathy with FPC. All of these rulings have had some effect on the economics of particular companies or of the entire industry, to the extent of the factors involved. However, the principles announced by the Supreme Court in the Hope case until changed, affect directly the fundamentals of rate regulation by commissions and the review of such regulation by lower courts.

As I see it the question of testing a rate as to reasonableness is still an open question. The Supreme Court as it has

been constituted in the last decade, has tended more and more to approve the actions of the FPC and it would seem that at one time there was some possibility of a final clean-cut decision in which the Commissions' "depreciated original cost rate base" would be approved. Whether this is still imminent is a matter for speculation. However, it is plain from official acts of NARUC and of FPC that regulatory authorities are generally inclining more and more to the use of such a rate base. The 1946 report of the NARUC Committee on Valuation stated, "Under the Supreme Court decisions to which reference has been made, it is now possible and in most cases mandatory upon the commission to take as the rate base the actual cost which should correspond to the invested capi-



Rate testing is an open question

tal." Seemingly, only clear, decisive legislation, setting forth the path which must be followed can halt or divert this trend.

Aggressive and informed management should lead the way so that Congress can accurately be informed as to the practical application of such theories to the gas industry. There is enough evidence now as to the end result should such principles become established.

A. G. A. President Hargrove has ably summarized this situation in his testimony before the FPC in its recent Natural Gas Investigation when he pointed out that the end result would be "the transfer of the property from the company to the consumers." He pointed out further "Can it be successfully argued that such was the result intended by Congress in the enactment of The Natural Gas Act?"

It has been my observation, in the cases in which the original cost theory has been used, that the harm is not due altogether to the use of original cost but has been due also to the manner in

which it is used. In the FPC cases, it is the deduction of depreciation on an age-life basis coupled with a rate of return entirely inconsistent with the rate base which does the main damage, not the use of original cost per se.

It is a fact that the *entire* property is operated at the risk and responsibility of the owners. It exists physically, is productive and of service, yet the company is deprived by an accounting procedure of any reward whatever for the operation of a large part of it. Recently the Missouri commission recognized the inequity of such a situation by ruling that the rate of return should be applied to the total original cost with a credit against the total return equal to a three percent interest rate applied to the depreciation reserve. If it should be eventually conceded that original cost is something to be accepted as a matter of necessity, then this latter day Missouri compromise might be a practical modification.

It must be realized that the allowance is the final result of the Siamese twins of rate base and rate of return. As Carl I. Wheat has stated, the two elements are meaningless when considered separately and unless these factors are consistent in an economic sense, their product can result in a proper answer only by accident.

Obviously, the presently accepted determination of a fair rate of return on the basis of current interest rates, price-earnings ratios, etc. i.e. factors based on present values, produces an inconsistent and inequitable result when applied to an original cost rate base which is at best a measure of values *removed from the present by a period approximating the average age of the property* when such earning and interest factors may have been higher or lower than now.

Actually it might have been much

simpler even in the past to reflect the changing purchasing power of the dollar through the rate of return rather than through the rate base. Price indices are readily available by which the rate can be trended to the proper point. Attempts to accomplish this have been made, and some of the commissions using a cost basis of valuation have recognized the situation by "judgment" adjustment to more practical levels of rate of return.

I would suggest that this question offers a fertile field for legal and economic research and that the industry might well use its concerted efforts to the end that rate of return should always be properly consistent with whatever rate base is selected.

The growing tendency in rate regulation is to emphasize the accounting phase and to minimize the engineering phase. It has been freely stated that the ultimate goal of this movement will be realized when regulatory authority can establish the proper rate solely by calculations based on the data contained in the income statement and the balance sheet.

Method Is Fallacious

Again Mr. Justice Jackson has expressed much better than I can the fallacy of such a method when he said in his dissenting opinion in the Hope case:

"To make a fetish of mere accounting is to shield from examination the deeper causes, forces, movements and conditions which should govern rates. Even as a recording of current transactions, book-keeping is hardly an exact science. As a representation of the condition and trend of a business, it uses symbols of certainty to express values that actually are in a constant flux. However, our quest for certitude is so ardent that we pay an irrational reverence to a technique which uses symbols of certainty, even though experience again and again warns us that they are delusive."

Should the end point of such accounting regulation be reached, the industry would be under continuous rate regulation in the future as compared with the intermittent regulation of the past. In such case and in addition to the fact that our property would no longer be ours, we must face the fact that our companies would no longer be organizations whose operations are based on the profit motive, but social service organizations

with no guaranteed return and with a continuously manipulated ceiling beyond which net revenues may not pass.

Let me reiterate that I believe the industry should realize that unless the



Time for diverting trend is short

present trend is diverted by clear decisive legislative action impossible of judicial misunderstanding and involved interpretation, this may become the general condition under which we must operate.

Now as to the situation with respect to rates and rate structures, their adequacy to meet present markets and what appears to be desirable future trends.

For many years the American Gas Association rate committee has urged the development of rate structures which fit each company's market area but at the same time produce total earnings consistent with regulatory limitations. The 1927 committee report observed that "The gas industry in this country is moving away from its long-standing practice of doing business on average rates."

Since then gas rate structures have made steady progress along the rational path leading to the greatest market development consistent with cost of service. There seems to be no question among us now that gas rates should be diversified to the extent of market requirements and except for regulatory limitations, we have no hesitancy to develop class rates for the stimulation of sales if such are profitable. While gas utilities cannot operate like department stores or other commercial establishments and have only one product for sale, yet if one can think of the gas business as supplying as many kinds of products or services as there are uses for gas, the reasons for a flexible and diversified "department store" type of rate structure, with classifications based to some extent on Value of Service, become evident.

So Be It

● The Fairteen Club, an organization of high school girls, has issued this "directive" for the benefit of all present and future baby sitters amongst its members:

Do—homework, read a book, check the baby every half hour, knit or sew.

Don't—dress sloppily, turn radio on loud, invite boy friend in to jitterbug, raid ice box or make a lot of 'phone calls, hold the baby over the gas stove to dry its diapers.

The need over the years for this approach to practical rate making is not entirely because the industry was in a highly competitive situation but also because we and our customers developed so many new uses for gas that required special treatment from a rate standpoint.

That the rate men of the industry have learned this lesson well is evident by the large number of class rates now effective. It is of further significance that these rates have the sanction of regulatory authority, hence these officials are tempering their social and political viewpoints with a recognition of economic factors.

During the recent depression years a rash of rate plans and class rates were developed for the purpose of expanding gas sales and extending service into new market areas. It is no doubt true that many a headache has developed out of this situation—among them the present house-heating paradox—but on the whole I believe that the industry gained in the long run as a result of such "expedient" rate making.

In the short view we obtained badly needed earnings which would have otherwise gone to our competitors, and in the long view we conserved existing markets and established ourselves in new markets which we would not now have.



Costs are inflated

Present rate structures are therefore to some extent an inheritance from recent depressed economic conditions resulting from World War I. Today we are faced with the major problem of meeting inflated costs and additional demands for our services. The matter of raising rate levels is primarily a responsibility of management and the major element is the selling of any rate increases to our

commissions and their staffs. I am not referring to the overall justification of the need for added earnings—such is assumed to be the case—but to the distribution of any justified total increase to the various divisions of our markets.

There are two important aspects to this problem—first: The proper and acceptable allocation of increased costs to each class of service and second: The effect on sales when rates are increased.

Cost allocation is an important function of our rate departments, since an arbitrary or nonfunctional assignment of costs to the various divisions of our markets may be unacceptable to regulatory authorities with consequent difficulties in adjusting rates appropriately. Then again, any allocation which excludes the elements of fairness and competitive conditions will result in rates less suited to the full development of our service than if the costs are apportioned with due regard to the interests of the largest number of customers.

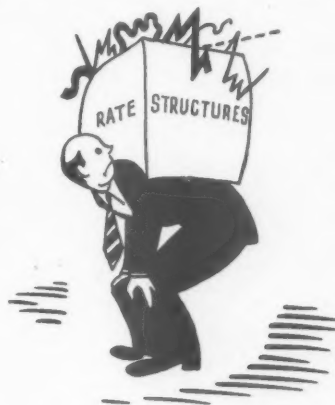
Emphasis Misplaced

In many cases, because these factors have not been appropriately weighed as to their total significance, commissions and their staffs have emphasized the commodity element of total cost and minimized the demand and customer cost elements. This tendency seriously affects final determination of both retail rates and those for wholesale business. In the case of natural gas companies this effect is felt in retail rates through the "city gate" rate first and then through the distribution cost elements. In their wholesale rates, the minimizing of the demand elements ultimately causes inordinate increases in required capacity without corresponding adequate revenue, especially in these days of increasing house heating sales. I believe that a concerted effort should be made by the industry through research and education to obtain commission recognition of the vital necessity of properly allocating costs to give effect to all functional and competitive factors.

It appears now that we should lend every effort to obtain necessary rate increases since it is apparent in many instances that any new capital required will not be forthcoming unless it can be supported by an adequate price structure. Therefore cost determinations and allocations should be carefully developed so

that no delays will be experienced because of errors or omissions therein.

Gas sales are influenced in varying degree by changes in rate levels, and while the exact evaluation of say, the reduction in sales or curtailment of increase for a given service after a five cents per mcf increase, is not possible, yet some attempt to estimate its magnitude should be made since this has a bearing on capital requirements. Reference to the A. G. A. Rate Committee's 1936 report illustrates the effect of rate changes on the Cooking, Water Heating and Space Heating markets. As a large portion of



Many companies are overburdened with antiquated house heating rate structures

our costs are a function of property it is also necessary that the load characteristics of each market division be available in order to translate changes in sales into dollars of investment and other costs. Here again the support of the entire industry should be given to the necessary research to provide the rate engineer with the proper tools with which to work.

I believe that the most pressing problem at this time is what the gas industry does about the large demands being made on it for house heating. As already pointed out we are living with a house heating rate structure of pre-war vintage based on incremental costs to a large extent. When increments of reserve capacity run out, then additional capacity must be supplied and costs will rise. Such total costs for house heating service will be relatively higher than for most any other service because of its low load factor. Another peculiarity of the gas heating load is its sensitivity to changes in price level. Thus if an in-

crease in house heating rates is made, a relatively larger decrease in present as well as potential house heating sales will occur than if a comparable increase in rates for water heating service were made.

I am not leading up to the suggestion that we should be able to turn house heating sales on and off by clever rate manipulation. On the contrary, I would suggest that while house heating sales can be and probably should be controlled by price adjustments—just as the volume of every other commodity or service is controlled in a free economy—it is for the very reason of such sensitivity to price that we should plan every house heating rate change with care and due regard to its effect on our customers.

House heating is a very important part of our service; without it we might be dispossessed by our competitors of a large fraction of the other domestic use market. It serves a dual purpose therefore, and we should exert every effort to place it on a sound permanent basis.

Obligations Assumed

Within the framework of revenue and operating costs we sell a heating service, but in so doing we also assume the obligation to serve the customer in a satisfactory manner for an indefinite period. The customer has, as a result of representations by the company, made a relatively important capital expenditure and adjusts his living conditions to the service. Any prolonged interruption during sub-freezing weather may result in property damage as well as a health hazard. We should therefore design house heating rates with due regard to effects perhaps more far reaching than for any other class of service.

Any practical approach to the problem of adjusting house heating rates must give consideration to the interdependence between the individual rates of a company because of the ceiling on total earnings. It is conceivable that an appropriate increase in rates for house heating would result in excess earnings and that consequently the rates for other classes of service would be reduced. While it would be politically expedient to reduce charges for initial blocks of consumption say within the first 1,000 cubic feet of monthly consumption, such a policy should be resisted within com-

petitive limits. There may come a time—not too far distant—when we will need the earning power of our initial charges, just as in the last depression, rate structures having high initial charges helped maintain earnings as sales decreased.

With respect to other classes of service it would seem that selective increases, dependent upon load characteristics, be given attention. While such price splitting upwards will result in more rates, we should not forget that we will obtain increased earnings only after regulatory proceedings have been completed and such delay may be partly offset by the larger rewards obtained by a multiple rate structure. A carefully balanced program where rate increases are properly related to competitive and social pressure should result in a larger gross revenue change, after allowance for reduction of sales, than if say a uniform increase became effective over all classes of service.



Familiarizing economists and engineers with gas company problems

While we cannot do very much about competitive conditions except to reduce price and costs we should address ourselves to the problem of political and social opposition to rate increases. In my own experience I have found that familiarizing the economists and engineers on commission staffs with the actual everyday problems of the company is an essential element in reaching a common understanding as to the realities of the situation. We will always be required to defer to political considerations—this being inherent in any public service activity—but by continual consultations with commission members relative to the economic phases of our business,

regulation can be kept within rational limits to the extent that legislation permits.

Here are a few suggestions as to how we as a regulated industry can adjust ourselves better to meet the changing economic conditions in the postwar period just ahead!

Stability Needed

First we should exert every effort to have regulation—particularly Federal regulation—placed on a more stable foundation than now exists. We have seen how over the years we have been subjected to various philosophies of regulation as a result of the lack of legislative directions to regulatory authorities and the courts.

The basic provision that rates shall be "just and reasonable" should be coupled with a clarifying clause that provides for value of service as a yardstick as well. This element has long been recognized in state regulation but not with the weight it deserves considering its beneficial implications to gas customers and the industry.

We should be prepared to enter the first postwar depression with flexible and diversified rate structures. It would appear now that competitive fuel prices may not recede as much as past experience might indicate. This may also be true of our own labor and material costs as a result of recently developed social and labor philosophies. Therefore rates will probably stabilize at higher levels than now effective, but with such advance it is evident that sales may be lost to competitors whose costs do not advance proportionately. We should not hesitate to consider special rate forms to meet contingencies of this character.

Anticipate Conditions

The industry seems to have fewer class rates today than prior to World War II; our recent thinking perhaps has been directed to more simple rate structures. If rates were decreasing or competitive conditions were easing such a policy would be appropriate. Since however during the next few years contrary conditions should be anticipated we should provide ourselves with rate structures which will protect earnings from competitive inroads as our industry adjusts its prices to meet the new conditions.

Personnel Conference Milestones

Midwest group finds meetings
help create more healthy, con-
structive industrial relations
among member gas companies

BY D. L. SEDGWICK

*Superintendent of Gas Operations
The Kansas Power and Light Co.
Salina, Kansas*

The following article is a review of a paper entitled, "Purposes and Activities of the Midwest Personnel Conference" presented by C. C. Jolley, director of personnel, Natural Gas Pipe Line Co. of America, Chicago, at the fortieth annual meeting of the Mid-West Gas Association, May 9, 1945.

The Midwest Personnel Conference is the second such conference to be organized under the sponsorship and sanction of the American Gas Association—The Author.

IN 1943 the Petroleum Administrator for War appointed a committee to represent the natural gas and natural gasoline industries in the preparation of a job classification list for industry, the Selective Service boards, and other government agencies. The work of this committee was satisfactorily completed and the job descriptions printed in book form and distributed by the American Gas Association in June 1943. The apparent need for a similar list of job classifications covering workers connected with natural gas distribution activities prompted M. V. Cousins, personnel director, United Pipe Line Co., Shreveport, La., to call together a group of men representing natural gas pipeline and distribution companies in Texas and Louisiana to prepare such a list. Several of the men had worked on the

P. A. W. Committee, making the work much easier. This particular job was completed and the book released in October 1943 by the A. G. A.

During the progress of the work it became apparent to these men that they and the companies they represented had many common problems in industrial relations—many of them caused by wartime conditions. Discussion of these mutual problems and the desire for continuing such study prompted the organization of the A. G. A. Southwest Personnel Conference.

During subsequent meetings of that newly organized group, representatives of natural gas companies whose operations extended north of Texas became acquainted with the work of the Southwest Conference. A group of these men representing natural gas pipeline companies operating in the middle-west met at Kansas City in September 1944 to discuss the established wage rates approved by the VIII Regional War Labor Board.

Responsible for that meeting was R. B. Harkins, personnel director of Panhandle Eastern Pipe Line Co., Kansas City, and it was through his efforts that A. G. A. approval and sponsorship was secured and the Midwest Personnel Conference formed.

The first meeting of the Conference was held in Kansas City, October 25, 1944 with 14 attending. Kurwin Boyes, A. G. A. secretary, and Mr. Cousins, chairman of the Southwest Conference, were present and helped the new organization to a good start. Mr. Harkins was elected chairman.

Original Idea

The original idea was that the Midwest Personnel Conference would be composed of men concerned with industrial relations problems of natural gas companies operating in Kansas, Nebraska, Iowa, Missouri and Arkansas. However, as a result of Mr. Jolley's convincing presentation two years previous, the Mid-West Gas Association Executive Council adopted a resolution petitioning the A. G. A. Executive Committee and officers of the Midwest Personnel Conference to include territory of the Mid-West Gas Association with the territory then served by the Midwest Conference, that members of

that association might take part in the conference.

The resolution was unanimously approved. Thereafter the territory served by the Midwest Personnel Conference comprised 11 states—the original five—Kansas, Nebraska, Iowa, Missouri and Arkansas and the six in the Mid-West Gas Association territory—Montana, Wyoming, Colorado, Minnesota and both Dakotas.

Keep Same Goal

After 2.5 years and 12 meetings of the organization the purposes and goal remain the same. But in addition, relationships have developed between representatives and the companies they represent which are proving of even greater value to individuals, companies and the industry than the information secured through the discussions. The development of the knowledge of and concern for the problems confronting the other fellow have made the conference worthwhile.

Some of the subjects covered are:

"Interviewing, Placement and Indocination of the New Employee," "Wage and Hour Law Interpretations," "Supervisory Training," "Merit Rating and Wage Administration," "Union Contracts and Labor Trends," "Administration of a Personnel Department," "Wage Surveys and Interpretations."

One of the outstanding presentations was the subject of "Job and Salary Evaluation," ably and thoroughly covered by O. L. Jones, R. R. Allen, and H. T. Taylor, Oklahoma Natural Gas Company.

In November 1946 a joint meeting with the Southwestern Group was held in St. Louis on two days immediately preceding meetings of the A. G. A. Personnel Committee and the Edison Electric Institute Industrial Relations Committee. A similar meeting is planned for this fall.

It seems clear that the type of meeting and material presented at the A. G. A. Midwest Personnel Conferences are particularly conducive to accomplishing, largely through personal contacts, the goal set by our first two chairmen, R. B. Harkins and C. C. Jolley, creating more healthy, constructive industrial relations among the natural gas companies.

Condensation of a paper presented at Mid-West Gas Association Annual Meeting in Omaha, April 7-9, 1947.



Technicians check script before cameras start rolling



The New Freedom Gas Kitchen forms a glamorous setting



New Gas Sound-Color Motion Picture

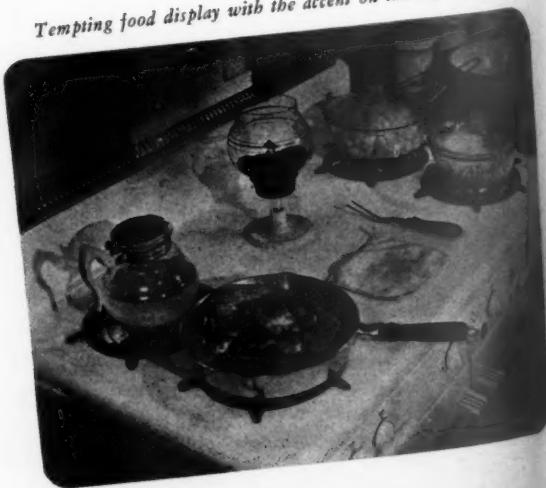
AN elaborate new 16 mm sound-color motion picture "Winning Seals of Approval," recently completed by the American Gas Association, tells dramatically and effectively the story of the rigid performance tests which the modern gas range undergoes before meeting the industry's nationally recognized standards of approval. The film will be released shortly for showing throughout the country.

More than 75 scenes and a cast of 16 people were utilized in the picture which is based largely on operations at the A. G. A. Testing Laboratories. Much of the story centers around some of the 600 tests a gas range must pass before winning the A. G. A. Seal of Approval. Scenes include operations in a factory laboratory and field inspections on the production line of

Actor portraying first technician at A. G. A. Laboratory



Tempting food display with the accent on the top burner





A savory meal puts the spotlight on the gas broiler



Scene demonstrating the range surface temperature test

one of the largest manufacturer's plants.

The last one-third of the film deals with the additional requirements involved in the making of a range built to "CP" standards. Thus the total effect of this new gas medium is to reveal the many outstanding qualities of the automatic gas range by accenting the authoritative Laboratory work behind its superlative operating performance.

At least ten different "CP" model gas ranges and two complete New Freedom Gas Kitchens are employed in the picture. In the course of the film a great number of mouth-watering foods are shown in full natural color. Complete meals are cooked on top burners as well as in ovens and broilers and the roasting and broiling of various meats and baking of cakes and cookies are demonstrated.

Widespread distribution is planned and will include an effort to reach one million students in the current school year, through booking of 100 prints in high school and college home economics classes by Modern Talking Pictures Service. A special Teachers' Manual being prepared for use with the film will suggest pre-showing discussion and study and post-showing discussion and quiz.

Fifty prints will be held by the A. G. A. Promotion Bureau, which supervised the film, for distribution to member companies contributing to the Research and Promotional Fund. These will be for showings before adult groups and may be used in connection with home demonstration classes as well. A. G. A. member companies and range manufacturers may purchase prints at actual cost of ap-

proximately \$115 each.

Preview showings of "Winning Seals of Approval" will be made in mid-June and July. School showings will get underway in September and prints will be ready for gas companies as soon as available, probably in August.

The new picture was filmed at Wilding Picture Productions, Inc., Chicago, and was directed by Lou Kramer. Technical advice was given by Carl F. Geltz, A. G. A. Testing Laboratories. Cooking of all foods used and technical advice on home economics was furnished by Mary Swiston, The Peoples Gas Light and Coke Co., Chicago.

All inquiries should be addressed to Promotion Bureau, American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Behind-the-scenes with crew and cast during filming



Demonstrating an all-oven meal in the new gas range



"Truck-to-Office" 'Phone



Using mobile radio-telephone installed in Payne Furnace Co. service truck

PAYNE FURNACE CO., Beverly Hills, Calif., has announced the inauguration of mobile radio-telephone service to enable the company's fleet of service trucks to maintain telephone contact with the plant's service department at all times.

This special two-way communication system permits Payneheat's main office to relay

service calls to the truck operator while enroute or on another job. The truck operator originates calls by pushing a "talk" button which puts him in touch with a telephone company mobile service operator who in turn connects him with the number called. Tests showed that local "Mobile Service Operator" has functioned normally during the telephone strike.

The Company's first radio-phone equipped service truck is now in operation and the entire fleet of service trucks will be similarly equipped when facilities are available.

1948 A. G. A. Convention

THE 1948 Convention of the American Gas Association will be held in Atlantic City, N. J., the week of October 4. At a meeting in Milwaukee, April 28, the Executive Board approved the recommendation of the Time and Place Committee of which Alfred Hirsh, vice-president, The Laclede Gas Light Co., St. Louis, Mo., is chairman. The action of the Executive Board will be referred to the 1947 Convention for the ratification of the membership.

Ordinarily, the report of the Committee on Time and Place for the 1948 Convention would have been made and acted upon at the 1947 Convention in Cleveland but present conditions required earlier action to assure suitable accommodations.

Gas Publication Cited



This cover of "News Meter" took first place in 1947 Red Cross Fund cover contest. Magazine is published by San Diego Gas & Electric Co.

A. G. A. Executive Group Appointed

AN Executive Committee of seven members with full power to act for the Executive Board of the American Gas Association between regular meetings was appointed at the April 28 meeting of the Board held in Milwaukee. This action follows adoption of a recent amendment to the A. G. A. Constitution and By-Laws by the Association's membership.

The executive group, which is expected to expedite the conduct of Association affairs, consists of the president, R. H. Hargrove, vice-president, United Gas Pipe Line Co., Shreveport; the vice-presidents, Hudson W. Reed, president, The Philadelphia Gas Works Co., and Robert W. Hendee, president, Colorado Interstate Gas Co., Colorado Springs; the immediate past-president, Everett J. Boothby, vice-president and general manager, Washington Gas Light Co., Washington, D. C.; Lyle C. Harvey, president, Bryant Heater Co., Cleveland, representing the manufacturers; George F. Mitchell, president, The Peoples Gas Light and Coke Co., Chicago, and E. H. Eacker, vice-president, Boston Consolidated Gas Company.

Underground Gas Storage Expanded in Illinois

THE Public Service Company of Northern Illinois announced on May 10 a new project for underground gas storage in collaboration with the National Tube Company, subsidiary of United States Steel Corporation. Experts believe that the new method of storage will be widely adopted in the industry.

The storage unit will be located beneath a 160-acre tract at Mount Prospect, Illinois, and have a capacity of 40 million cubic feet

Gild of Ancient Suppliers Holds Reunion



Gild of Ancient Suppliers breakfasting during A. G. A. Natural Gas Convention

MEMBERS of the Gild of Ancient Suppliers gathered at a breakfast meeting in Chicago, May 1, during the Natural Gas Convention in that city.

Among those present were Floyd K. Lawson, George D. Roper Corp.; Clifford Johnstone, Pacific Coast Gas Association; Harold O. Andrew, and J. H. Moore, Gas Age; R. B. Wilmarth and W. G. Hamilton, Jr., American Meter Co.; E. Carl Sorby, George D. Roper Corp.; C. B. Dushane, Jr., American Meter Co.; H. Leigh Whitelaw, Gas Ap-

pliance Manufacturer's Association, and John J. Delaney, Reliance Radiator Company.

Also present and shown seated in the accompanying picture were R. W. McClenahan, American Meter Co.; William J. Foster, George D. Roper Corp.; H. W. Springborn, Gas Age; Frank J. Nunlist, L. J. Mueller Furnace Co.; Romus T. Bergh, George D. Roper Corp.; Carl F. Asendorf, American Meter Co.; Rodger C. W. Olson, Ruud Manufacturing Co.; A. W. Bohne, Tapecoat Co., and Walter V. Turner, Gas Age.

of natural gas as compared with the 1,250,000 cubic foot capacity of the Kankakee, Ill., pilot plant which the company designed and placed in operation early this year (story on the pilot plant is contained in the April, 1947, issue of the MONTHLY).

Pipe sections in the underground project will be fashioned from 24-inch seamless molybdenum steel pipe similar to that used in the Big Inch except that the wall thickness is one half inch compared with the three eighths inch size in the Big Inch. Each complete pipe section will be 40 feet long with a capacity of 25,000 cubic feet at 2240 pounds pressure.

The utility reports that underground gas storage primarily has a lower cost of initial installation, and secondly, lower operating and maintenance costs than conventional gas holders. Other features, the company states, are that storage in numerous small units facilitates replacements and that the subterranean location eliminates above-ground hazards.

Lone Star Plans Large Expenditures

LONE STAR GAS CO. anticipates expenditures of more than \$9.5 million for extensions and additions to physical properties this year to meet growing requirements for service, President D. A. Hulcy has announced. This amount has been budgeted for construction and equipment over the gas system comprising 321 cities and towns in Texas and Oklahoma.

Some of the projects are under way and others will be started when materials are available, Mr. Hulcy said. Following are the principal expenditures:

Service lines, street mains, meters, regulators and other facilities for serving customers, \$3,279,513; acquiring leases and drilling wells to insure adequate gas supply for many years, \$2,560,230; pipeline construction from and in gas fields to tap additional reserves and to give additional transmission capacity, \$1,732,100; dehydration, cycling and gasoline plants to treat gas and promote conservation, \$1,071,650; supplementing existing facilities, such as automotive equipment, machinery, tools and building improvements, \$986,105.

F.P.C. Shows Natural Gas Income Rise

NET income of natural gas companies subject to F.P.C. jurisdiction increased about \$15 million during 1945, according to data included in "Statistics of Natural Gas Companies—1945" issued recently by the Federal Power Commission. Total 1945 net income was \$107,409,340 in comparison with \$92,084,236 in 1944. The number of customers served increased from 3,676,189 in 1944 to 3,877,394 in 1945.

The statistical publication is compiled from reports of natural gas companies to the F.P.C. for the calendar year 1945, and contains financial and operating information on 111 gas companies.

Atomic Power and the Gas Industry

● There has been a great deal of publicity about atomic power. In a direct sense this is a misconception since atomic fission yields heat rather than power. If this heat can be controlled it can be used for coal carbonization, oil cracking or the gasification of carbon with steam just as it could be used for steam generation.

The time may come when the public will use atomic heat or energy in a direct manner,

but it seems probable that this energy will be converted to more conventional forms for some years to come. Our business is fundamentally concerned with the use and application of heat, and we should be able to utilize this new energy when and if it becomes available.—EDWIN L. HALL, Coordinator, A. G. A. Gas Production Research, at N.E.G.A. Business Conference, March 20.

Home Service at Birthday in Savannah



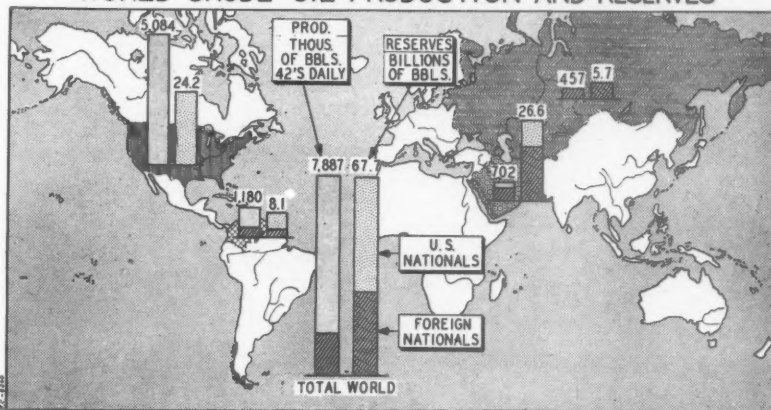
Home service personnel gathered in the "Wonderflame Room" celebrating its first anniversary

THE home service department of the Savannah Gas Co., Savannah, Ga., celebrated the first anniversary of its home service kitchen and auditorium, the "Wonderflame Room," recently with a luncheon for Jessie McQueen, home service counsellor of the American Gas Association.

Those present were: Myrtle Earl, home service director, Savannah Gas Co.; Sarah Kelly, home service director, South Carolina Power Co., Charleston; Virginia Ware, home economics instructor, Savannah High School; Bonnie Turner, home economics

supervisor, Chatham County, Ga.; Virginia Heard, assistant superintendent, Chatham County Public Schools; Jessie McQueen, A. G. A.; Mrs. Julian Hartridge, special consultant, and Rose Varn, home service representative, Savannah Gas Co.; Mattie Byerly, assistant home demonstration agent, Chatham County; Laura Hane, nutritionist, Savannah Chapter, American Red Cross; Anna C. Hunter, Savannah Morning News, and Leonora Backus, home demonstration agent, Chatham County.

WORLD CRUDE OIL PRODUCTION AND RESERVES



L. F. McCollum, Standard Oil Co. (N. J.), notes that U.S. total produced crude oil and proved reserves are about half total potential resources, while the rest of the world has only scratched the surface with a little more than one-tenth of the potential resources produced or proved

Natural Gas Enrolls at Michigan State



Part of the nation's largest college housing project at Michigan State College



Consumers Power Co. crew laying gas feeder main which will help supply the project

NATURAL gas has been selected for use in the nation's largest college housing project now underway at Michigan State College and all services will be supplied by the Consumers Power Co., Jackson, Michigan. Enrollment has soared from 3,875 in 1943 to over 13,000 and this spring is expected to exceed 17,000, with the increase due primarily to returning veterans taking advantage of government assistance.

The completion of this housing project will find 12,000 people residing in college-operated facilities of all types. There will be 11 permanent apartment buildings containing 184 units for married veterans and their families and 12 permanent dormitories housing 6,300 single students. Each dormitory will contain a dining hall and an all-gas equipped kitchen. These dining halls, together with two completely gas-equipped cafeterias, will serve over 24,000 meals a day.

Three hundred and fifty former army barracks buildings are being converted into units, which will provide 1,148 apartments for the veterans and their families. Each apartment will contain a living room, bedroom, bath,

kitchen and closet space and each kitchen will be furnished with an apartment-type gas range and a 20-gallon automatic gas water heater. Although this project is temporary, it is expected to be used for at least ten years.

An intermediate pressure system consisting of 2.5 miles of mains and eight miles of services supplies gas to these 1,148 apartments, and is connected at three points to the Consumers Power Co. feeder main. At each of these points a regulator and master meter reduces the pressure to the system and measures the quantity of gas the college purchases.

Personality Helps

ACCORDING to a survey of employers and colleges, made by the Engineers Joint Council, personality comes first among nine considerations studied by employers of engineers. Next were scholastic record, promise of specific development, engineering experience, ability to cooperate, recommendations, executive potentialities, standing of candidate's college and salary requested.

Convention Calendar

JUNE

- 2-4 •A. G. A. Joint Production and Chemical Committee Conference, Hotel New Yorker, N. Y.
- 2-5 •Edison Electric Institute Annual Convention, Atlantic City, N. J.
- 3-6 •The Institution of Gas Engineers, Annual Meeting, Birmingham, England.
- 9-11 •Canadian Gas Association, General Brock Hotel, Niagara Falls, Ontario.
- 11 •A. G. A. Southwest Personnel Conference, Peabody Hotel, Memphis, Tenn.
- 11-14 •Heating, Piping and Air Conditioning Contractors, Netherland Plaza, Cincinnati.
- 16-19 •American Society of Mechanical Engineers, Semi-Annual Meeting, Chicago.
- 23-24 •A. G. A., N. Y.-N. J. Sales Conference, Essex and Sussex Hotel, Spring Lake, N. J.
- 23-27 •American Home Economics Association, Municipal Auditorium, St. Louis, (A. G. A. will exhibit).

JULY

- 7-8 •Michigan Gas Association, Grand Hotel, Mackinac Island, Mich.

AUGUST

- 25-27 •Appalachian Gas Measurement Short Course, West Virginia University, Morgantown.

SEPTEMBER

- 8-10 •Mid-West Gas School and Conference, Iowa State College, Ames, Iowa.
- 15-17 •National Butane-Propane Association, Annual Convention and Exhibit, Jefferson Hotel, St. Louis.
- 23-25 •Pacific Coast Gas Association, Hotel Del Coronado, San Diego, Calif.

OCTOBER

- 2-4 •Mortgage Bankers Association of America, Statler Hotel, Cleveland. (A. G. A. will exhibit).
- 6-8 •A. G. A. Annual Convention, Cleveland, Ohio.
- 6-10 •National Safety Congress & Exposition, Chicago.
- 20-24 •National Metal Congress & Exposition, Amphitheatre, Chicago (A. G. A. will exhibit).
- 21-23 •American Standards Association, Waldorf-Astoria Hotel, N. Y.

NOVEMBER

- 10-14 •National Hotel Exposition, Grand Central Palace, N. Y. (A. G. A. will exhibit).

DECEMBER

- 1-5 •American Society of Mechanical Engineers, Annual Meeting.

Accounting Section

LEITH V. WATKINS, Chairman

JOHN A. WILLIAMS, Vice-Chairman

WALTER E. CAINE, Secretary

Write the Way You Talk

BY C. L. SULLIVAN

Chairman, Project Committee, The Peoples Gas Light and Coke Co., Chicago

ALL of us have met people in business who were extremely pleasant to converse with and very helpful in clearing up some misunderstanding we may have had with their company. The personal contact was so agreeable that we looked forward to meeting the person again. But all of this was quickly changed when we received a letter from the same person. Why, we just couldn't believe that the writer was the same person with whom we had talked!

In the office he was perfectly natural and friendly yet there was his letter with stilted language, a lot of meaningless "dribble," it was even difficult to know just what he was trying to tell us.

What brings on this Dr. Jekyll and Mr. Hyde complex in people? If a person can talk pleasantly and clearly, why can't he write the same way? The answer is very simple—he just isn't himself when he writes letters. Bound down by traditions that go back for years and years, our sociable friend believes that you must talk one way but write another.

Shortly after I became associated with the customers department I happened to be at our main office in the public contact section when a dear little old lady came in with a letter she had received from our company and requested one of our interviewers to explain to her what the letter was all about. It was true the lady was beyond the "life begins at 40" stage but she was unusually alert and sharp for a person of her age. In less than five minutes the whole situation was cleared up for her and smilingly she said good-bye and was on her way. Fortunately the interviewer kept the letter and I immediately inquired to see just what made it necessary for a customer to come to our office to have a letter from us explained.

Frankly, it was strictly a case of being "so close to the forest that we couldn't see the trees." The letter had a substantial portion of "shop talk," entirely meaningless to the customer. Little wonder she didn't know what we were writing about. The thought struck me "if you can talk it, you can write it."

The thing that kept haunting me in this case was that the interviewer had absolutely no difficulty getting the customer to accept his explanation of her problem, yet when we wrote the same facts they were so distorted

and jumbled that the customer couldn't understand what we were trying to say.

In the personal interview the customer has an opportunity to raise any points that are not quite clear in his mind but this, of course, only adds a further responsibility to the letter writer to write clearly and completely.



Author of a good business letter steps right out of the envelope and starts talking

About this same time I came across an article in *Printers Ink* which had to do with letter writing—both good and bad. The article went on to emphasize that, somehow or other, unnecessary and almost meaningless phrases find their way into many business letters. My witnessing the puzzled customer who had received a letter from us and the article in *Printers Ink* was all I needed to know that our correspondence should be improved.

The next move to bring our letter writing up to date appeared to be instruction by someone who knew what we needed and how we could get it. We were extremely fortunate in obtaining the services of an outstanding national authority on business letters who had been a manufacturer's agent, salesman, advertising manager, personnel director, and a teacher.

One of the first things our consultant did was to start a campaign of "off with the arti-

ficial and on with the natural." He illustrated this point by explaining that any business man who is going to be late getting home to dinner would not think of telephoning his wife and saying "I sincerely regret to inform you that I shall be late for dinner as of even date but with respect to same will arrive in due course." What he was trying to hammer home with this and other illustrations was that most of us are quite natural in our conversation but when we write a letter we put in the artificial scenery and for what, just no one seems to know.

The next step was for all of us to meet an imaginary customer who has become affectionately known as "Sophie Glutz." Poor Sophie didn't get far beyond the eighth grade in school and if we write so Sophie can understand us, the college graduate will also.

During the first week of our program to modernize our letters, we started omitting the formal opening and closing. Why should we cling to these old customs in letters? Certainly no one would think of starting a conversation with a customer as "Dear Sir" or "Dear Mr. Smith" nor closing it with "Yours very truly" or even "Sincerely yours."

The question may arise in your mind just how we got into the letter itself. We accomplished this by inserting the customer's name, if possible, in the first sentence. For example, after showing the customer's name and address we start right out by saying "Thank you, Mr. Jones, for calling at our main office." Believe it or not, at the end of the first week of this human approach we were receiving replies from customers addressing us as "Dear Friends."

One of the first experiences we had that proved we were definitely on the right track in our efforts to "write the way you talk," involved a letter we received from a customer who requested an adjustment for \$7.50 on his account. The writer was an elderly gentleman who had been a customer of ours for several decades and he reminded us of this in his letter along with the fact that life had been rather unkind to him and on several occasions he had been "pushed around" by big business. He gave us a little fatherly advice that we had better not try the same tactics.

Here was the challenge for the new approach in letter writing and the question was, could it make good? In answering, we thanked the gentleman for his inquiry, com-

Presented at Joint E.E.I.-A. G. A. Accounting Conference in Buffalo, April 7-9.

plimented him upon his long life and also expressed appreciation for the many years it had been our privilege to serve him. We readily agreed that a loss of gas had occurred at the outlet of the meter and that we were glad to make an adjustment of \$1.25 on his account, the amount of the actual loss.

In closing the letter, it was suggested that the customer might yet find happiness in a life that had been pretty well cluttered up with dark clouds, disappointment, and frustration. By return mail came a money order which paid his account in full, and accompanying it was a letter of thanks not only for answering the inquiry but for the fair and equitable adjustment. The customer also pointed out that in his half century of business dealings no one had ever written him a letter as nice as ours, a splendid compliment for us but a rather serious charge against business in general. This experience was all we needed to know that "write as you talk—customers like it" was not a theory but a reality.

One of the points in good letter writing that we learned was the need for the human touch. No matter how well worded a letter is, if it lacks "H.T." it simply will not click. By human touch is meant that the warmth and naturalness of the letter writer's personality should find its way into the letter. Closely allied to this factor is the friendliness that should run all the way through the letter.

It may be easy enough to get a favorable acceptance from a customer when the answer is "yes," but the true test of a successful letter writer is his ability to say "no" when necessary in such a friendly and human way that the customer will graciously accept the negative answer. In the final analysis, the minute the customer opens the envelope, the writer steps out and starts talking. Just as in the face to face contact, the problem is to "warm up" the customer in the very first paragraph.

The Human Touch

In developing the human touch in letters, an important thing to remember is not to get gushy—the person receiving the letter will immediately detect insincerity. When a customer writes about sickness, death, births, success, or moving to a new home, these are good "hooks" upon which the letter writer should hang his hat as he calls, by means of a letter, to talk with the customer. Our writers are always conscious of the fact that the little personal things mentioned in a customer's letter to us are important to *him*—so we take time to talk about them in our reply.

The use of the customer's name in the letter is helpful in creating a spirit of friendliness, but even this should not be overdone, or it again rings of insincerity. In a letter of two or three short paragraphs the use of the customer's name once is enough. In letters one page long, single spaced, the use of the name two or three times is sufficient to supply the personal, human touch.

When a customer tells us that the service was not discontinued on the date he requested, and he does not think he should be

charged for the final bill our letter might go something like this:

"Thank you, Mr. Doe, for writing about the final bill for service at your former home, 123 South Main Street.

"We are sorry the service was not discontinued on September thirtieth as you requested. However, to make things right, the \$1.70 bill has been canceled. You owe us nothing.

"We wish you health and happiness in your new home in Peoria. Should you return to Chicago and have occasion to use gas again, you will find us here waiting to serve you."

Spirit of Friendliness

One of the best devices for getting the customer's attention is to find something in his letter with which you can agree. It might even be that there was an increase in the amount of the bill, but you need have no hesitancy whatever in going along with the customer's observation and first agreeing with him and then explaining *why*. Here is an example:

"Thank you, Mr. Blank, for writing about your November bill.

"Yes, you are right, it is more than the previous ones. However, did you notice that the August, September and October bills were averaged? An averaged bill is issued when no meter reading is obtained. It may be for either more or less gas than was used but may be accepted because the next reading will adjust the account."

"Had you not received the averaged bills, you would have received one bill for service from August fifteenth to November fifteenth for \$12.16. This is an average monthly cost of \$3.04 and compares favorably with your July bill for \$3.12 and the August one for \$3.16. Thus, you see in spite of the November bill, your cost for gas is running about the same month by month.

"This little booklet we are sending along tells all about the gas meter. It will only take you a few minutes to read it through and you will find it full of interesting facts. Notice particularly on the last page an explanation of how to read the meter. This information will be helpful to you any time you wish to read the meter and check your own use of gas.

"It has been a real privilege, Mr. Blank, to discuss your account with you and you may be sure that you have been charged only for gas actually consumed."

You will recall it was suggested earlier that a spirit of friendliness run through every letter. The attainment of this goal is not always as easy as it may appear. The general tone of a letter can be quite friendly but suddenly a word or phrase creeps in that may make the customer actually boil. For the sake of tagging these trouble-makers so they are easily recognized, we have come to call them "red flag" words and phrases. A fairly common one is the expression "You failed." No normal person likes to be told he failed, nor does it build confidence for a large company to admit they "failed" to do this or that.

Occasionally we receive letters from customers temporarily out of the city making inquiry about their accounts, and they merely

sign the letter without giving us the address where the service is used. Our accounts are kept in street address order, rather than by customer's name, but few of our customers know this. It would be discourteous, to say the least, to write a customer: "You failed to tell us at what address you are using gas." How much more human and polite to say: "Before we can check your account, Mrs. Doe, it will be necessary for us to know the address at which the service was used. You see our customer records (nearly a million of them) are kept in street name and number order. Just as soon as we hear from you, we shall be glad to give you the information you requested."

Another equally dangerous approach to a customer is to write that he "must" do this or that. Let's suppose a customer's service has been discontinued for non-payment of bills and he writes to know how much is to be paid before the service can be restored. You could write a letter and include a sentence something like this: "You *must* pay the outstanding bills which amount to \$14.65 before the service will be turned on for you." How much nicer and more human-like to write: "Just as soon as we receive your payment for \$14.65, we shall be glad to restore the service."

Another red-flag expression tells the customer what he "ought" to do or know. Take the case of a customer who writes that he is surprised the gas service was discontinued, especially because the amount involved seems insignificant to him. Why he would fairly bristle if you wrote him: "You *ought* to know from the notices you have received from us that we intended to discontinue your service if the bills were not paid." To be sure he "ought" to have known, but let's not pour salt in open wounds. Don't you believe we would be more apt to regain such a customer's good-will by writing: "We are sorry your service was discontinued, Mr. Doe. We mailed you a notice explaining that if your payment was not received, it would be necessary to turn off the gas. It is unfortunate that our representative did not see you when he called at your home to accept your payment of the bills and in keeping with the terms of our notice, discontinue the service."

Build Good-Will

Occasionally we encounter companies, not only in the utility field but in other lines of business, where each department operates as though it were a separate company. This, of course, is quite puzzling to the customers. Suppose that the department receiving customers' correspondence gets a letter in which the customer requests an extension of time in which to pay a delinquent bill. Here is a marvelous opportunity for the building of good-will but frequently we see the opportunity muffed completely, or the letter weakened, by including a sentence like this: "Arrangements have been made with our collection department to defer action on your account until December tenth, as you requested." That makes it sound as if the collection department and the customers' de-

partment operate as separate companies. How much more friendly and human it is to say: "As you requested, an extension has been placed on your account until December tenth."

As far as practicable, it is perfectly all right to cooperate with the collection department in tactfully reminding the customer of a delinquency, if such be the case. Also, it is the duty of the letter writer to encourage payment of outstanding bills, even though the primary purposes of the letter may not be collection activity.

"Sophie Glutz"

Recently one of our customers wrote us as follows:

"I have lost an made a mastake in my gass bill. Id this the last gass bill or not and what do I ow u for gass. Please rite me and send me bill so I can pay it up."

This letter was not signed "Sophie Glutz" but well it might have been. Regardless of the misspelling, here was a direct and understandable letter from a customer who realized that she owed us money and wanted a bill so she could pay it. The following is the reply, and notice how the writer was complimentary to the customer in the closing paragraph:

"Thank you, Mrs. Doe, for writing about your gas account.

"The September bill, \$2.66, and the October bill, \$3.10, a total of \$5.76, are unpaid.

"As you requested, we are enclosing a bill for these items. The net payment period has been extended so that you will have the usual time in which to take advantage of the net amount.

"We appreciate your desire to pay this bill promptly, and thank you for this evidence of your good-will."

Someone has written, "The sweetest sound in anyone's ear is the sound of his own name." All of us who are in public contact work know of the advantage of addressing a customer by his name, just as soon as it is known. It is only reasonable, therefore, that if a customer's name is misspelled on his bill or on letters to him, it is annoying. A situation of this kind requires a straight-shooting apology and assurance that there will be no further mistakes in the spelling. For example:

"Thank you, Mr. Doeblank, for writing and for sending in receipts dated September 18th and October 1st, which are enclosed. Your cooperation has been very helpful.

"Yes, you are right, the August bill of \$4.47 was paid twice. As a result there is a credit of \$4.47 on your account which will be shown on your next bill.

"It seems we have been misspelling your name, Mr. Doeblank. We are sorry. From now on we'll do it right."

Experience in some large utility companies has proved that enclosing return envelopes for the customers' payment is not practical because few of them are used. If your company does not supply envelopes, and a customer requests them, it is a real challenge to

your letter writer to say "no" and to get the customer to graciously accept the negative answer. However, if you can give a little background of the reasoning for the negative answer, it helps the customer to see your view point. In the case we have been talking about, the following letter might do the job:

"Thank you, Mr. Doe, for suggesting that we enclose return business reply envelopes with our gas bills. Thanks also for your payment of \$1.97.

"We strive to give our customers efficient service and we have given a great deal of study to the suggestion you have in mind. However, the obstacle is that only 16 percent of our customers pay their gas bills by mail. With nearly 900,000 gas users in our city, this would mean that approximately 756,000 of these envelopes would not be used each month—and that would be a serious waste.

"Also, the separation of bills for customers who usually make payments by mail is prevented by the even greater cost of removing these bills during the billing operation, making the additional enclosure, and then resorting them for delivery purposes.

"The company does have for the convenience of its customers a number of authorized agents throughout the city. The Blank Company at 1022 Main Street, is our nearest authorized agent to your home. Also, the addresses of our Branch Offices are listed on the gas bill.

"We sincerely appreciate your interest in

Meter Readers Aided



Modified meter at right is easier to read

ONE of the practical operating questions discussed at the Edison Electric Institute-American Gas Association Joint Conference of electric and gas utility accountants at Buffalo, N. Y., April 7-9, was the matter of modified gas meter design to improve reading accuracy.

An exhibit of two brand-new gas meters, one of which was slightly lowered to improve visibility of the dials, was offered as a challenge to consumers' accounting representatives, meter operating personnel and meter manufacturers. The exhibit shows one gas meter with the solder-seal dial case in normal position on the meter case and the other meter with the dial case lowered $\frac{1}{4}$ " to provide increased visibility of the dials. The two meters were installed on a pipe frame with the bottom of the meter cases 6.5 feet from the floor as a practical and economic aid in reduction of meter reading errors and hazards to meter readers, who often must secure articles on which to stand.

Employee Relations Report Available

THE joint report of the Edison Electric Institute-American Gas Association employee relations committees entitled "Supervisory Training—A Keystone of Good Employee Relations" was delivered at the joint Accounting Conference in Buffalo, April 7-9, and is now available to Association members at a nominal charge.

The report on this subject of growing importance may be obtained by writing to the Accounting Section, American Gas Association, 420 Lexington Avenue, New York 17, N. Y.

making this suggestion, Mr. Doe, but we believe you will agree that under the circumstances the expense would not be justified."

The explanation of minimum monthly charges at one time proved to be extremely difficult for us to put in writing. We then decided to "write the way we talked." The following was in reply to a doctor who had written us at length asking for an explanation of the basis for our minimum charge:

"Thank you, Doctor Doe, for writing about the minimum charges for gas service and for your payment of \$3.64.

"As a professional and business man, you realize that every company has certain fixed charges. In our business, every account involves a number of necessary monthly operations. These are: reading the gas meter, preparing the bill, mailing it, and bookkeeping procedure. Our minimum charge is 60 cents monthly for each account on the General Classification Number one. For this amount, two therms of gas are available for your use.

"While it is true that you have used gas in your Bunsen Burner for about forty minutes in the past four months, the gas has been available for your use 2,880 hours. Any time during the day or night that you may have needed to see a patient at your office, gas was at your command.

"To bring this constant service to our customers requires the operation of our gas plant and distribution system twenty-four hours a day, every day in the year. Employees are on hand to meet any situation which may arise, and emergency service calls are promptly answered day or night.

"As a fair-minded person, Doctor Doe, don't you agree that for value received the charges are fair?

"We appreciate the privilege of explaining the minimum charges."

This business of "write the way you talk" is not a complicated technique and actually the very simplicity of it is amazing. Here are a few requisites we try always to remember:

1. You should like people.
2. Believe what you write—be sincere.
3. Write to people as you would talk to them face to face.
4. Just as your personality gets into your conversations, be sure to get it into your letters.
5. Strive for the human touch in your letters, but don't overdo it—don't gush!
6. Try to write as the customer does, using some of his language.

(Continued on page 303)

Residential Gas Section

WALLACE M. CHAMBERLAIN, Chairman

C. S. STACKPOLE, Vice-Chairman

F. W. WILLIAMS, Secretary

"You're Going To Be in Hot Water"



W. J. Schmidt

THE title is a prediction with a two-fold meaning: First—If you don't do something about an adequate supply of hot water for all household uses in the homes of your customers you will be in the wrong kind of hot water "in the soup." Second—If you aggressively promote hot water service with

adequate size, quick-recovery automatic gas storage water heaters you will be in the right kind of hot water "in clover."

In a report to the Press on January 1, 1947, D. P. O'Keefe, president, Gas Appliance Manufacturers Association, indicated a total sale of two million gas water heaters during the first year when abundant labor and material curtailments are not encountered and reliable sources estimate today's manufacturing capacity at a minimum of three million heaters per year. This statement provides a perfect runway for my take-off.

Present Equipment

The inadequacy of automatic gas storage water heaters presently available is shown in the article, "Hot Water for the Automatic Washer," in the July-August 1946 American Gas Association MONTHLY, from which the following quotation is taken:

"In an attempt to meet changing and increasing demands for hot water service the Approval Requirements Subcommittee for Domestic Gas Water Heaters approached the problem by contending a heater should deliver some reasonable percentage of its storage capacity as usable hot water. Defining usable hot water as water at 120° F or over, some comparative tests on contemporary underfired automatic storage heaters were conducted. Models with storage capacities ranging from 15 to 75 gallons, and of both internal and external type flues, were included."

These tests showed the following results which further emphasize the need for improved equipment if automatic gas storage water heaters are to retain their present po-

Abridgement of a talk at the A. G. A. Eastern Natural Gas Regional Sales Conference, Pittsburgh, February 13-14.

BY W. J. SCHMIDT

General Sales Manager, Long Island Lighting Co., Mineola, N. Y. Chairman, A. G. A. Water Heating Committee

sition of leadership in the all-important task of furnishing adequate hot water service, quickly and economically, to the homes of our customers.

Only eight percent of the heaters tested were capable of delivering 100 percent of their tank capacity in usable hot water at 120° F and above.

Only 42 percent could deliver 90 percent of their tank capacity in usable hot water at 120° F and above.

Only 71 percent could deliver 85 percent of their tank capacity in usable hot water at 120° F and above.

Only 88 percent could deliver 80 percent of their tank capacity in usable hot water at 120° F and above.

Only 94 percent could deliver 75 percent of their tank capacity in usable hot water at 120° F and above.

One hundred percent could deliver 70 percent of their tank capacity in usable hot water at 120° F and above.

These results were obtained under ideal conditions by experts working in a well-equipped modern laboratory.

Just how serious is the need for proper hot water service to an automatic washer?

Recent surveys indicate that approximately 55 percent of American families have two or more washdays per week. "Washday Monday," an old tradition, is slipping rapidly and while it is still the most popular, Tuesday, Friday and Saturday are tied for second place. Automatic cycle washers make possible this spread of washdays to meet the housewife's convenience. Other figures indicate families wash from one to eight loads per week, with an average of 4.85.

Some large electric utilities have already made surveys by having trained home service workers test the automatic laundry machines on their lines. One such electric utility operates in a natural gas area and it is reasonable to assume all their customers depend upon gas water heaters. This is what they found:

Automatic washers on lines totaled 5,232

(most of them in use three years or longer);

50 percent of the wash loads were started with water below 140° F even though 63 percent of the machines were set well above 140° F;

50 percent of all loads tested had hot water less than 125° F for the second load; third loads were impossible without waiting in most cases.

It was definitely proven that unsatisfactory washings existed throughout the lower temperatures. As a result of this survey:

- 6.3 percent installed new water heaters;
- 4.2 percent set up their thermostats;
- 2.2 percent made adjustments and repairs;
- 4.0 percent waited longer between loads;
- 3.6 percent washed on different days;
- 2.2 percent turned up the gas; and
- 3.2 percent preboiled the clothes.

If this survey is typical, it is evident that the gas water heaters now in use are far from adequate. The problem is ours and we must find the correct solution.

Indicated Demands

Let us take a look at what existing and future new developments will demand of an automatic gas water heater. For much of this information I am indebted to the Ruud Manufacturing Co., which has sponsored an extensive research project at Penn State College for the past three years and made this data available.

All recognized authorities agree that automatic cycle washing machines must have water in the washing compartment at 145-150° F to do a satisfactory laundry job. It has been established and generally accepted that 150° F water when used with proper soaps and detergents will produce the maximum practical results.

The Penn State research has further demonstrated the following points:

1. Water at 160° F is highly desirable from the standpoint of detergency and sterilization.
2. Built soaps (general types of washing compounds widely used for machine washing) are more effective as detergents at 145° F than at lower temperatures. This is also true of synthetic preparations.
3. Hot water washing is more effective in removing soil than low temperature wash-

ing—proven conclusively and without exception in more than 3,000 tests in commercial laundries.

4. Exhaustive tests have proven conclusively that hot water washing effects a much higher degree of sterilization than can be obtained with low temperature washing.

5. In general, temperatures higher than those ordinarily used in household practice, gave better soil removal results as well as more satisfactory removal of many stains. This is particularly true of deeply-imbedded soil and stains of an oily character.

6. For loosely held soil, as indicated by the early washes of the standard soiled piece used in this study, a washing temperature of 140-145° F was found to yield the best results. For firmly imbedded or ground-in soil, the order of effectiveness was found to be in the order of ascending temperatures, i.e. 180-185° F produced the highest degree of detergency followed by 160-165° F, 140-145° F, 120-125° F and 105-110° F.

7. Taking into consideration detergency results indicated by tests to date and cooling of the hot water which takes place between the water heater tank and the actual wash water temperature in the washer, the study indicates that a temperature of 150° F in the washing compartment is most practical for the home laundering of fabrics which may be washed safely in hot water.

8. In a sequence washer the total time required for a washing cycle is independent of the water temperature. Likewise, the total volume of water for the washing of laundry in such a machine is pre-determined by the manufacturer and is independent of the temperature of the water. The volume of water used will be the same at 130° F as at 160° F provided the load sizes and number of washing and rinsing steps are the same. The difference will be in detergency and sterilizing results.

When a manufacturer recommends a temperature of 150° F he means "working temperature" in the washer compartment—a very important factor not to be overlooked. There is always a difference between tank temperatures and working temperatures for very good reasons. Here are a few (assume a thermostat setting of 150° F):

Causes of Difference

There are usually several feet of pipe (un-insulated) between the tank and the washer. This pipe is full of cool or even cold water. The result is a dilution of hot water reaching the washing machine. It is not difficult to reduce the working temperature as much as 5° in that manner giving us 145° water at the washer.

We now have 150° F—5° or 145° F water available. However, the metal basket in the washer itself is cold and so are the clothes. They can easily absorb another 10° F. If the clothes are pre-soaked at 105°-110° F the hot water is further diluted to lower the working temperature. Thus it is possible to visualize a differential of 25 or 30° F between the heater tank temperature and the working temperature of water delivered to the washing compartment. *We can compen-*

sate for this temperature loss only in the water heater tank.

The washing machine manufacturers association estimate their industry will sell from three to four million new washers each year (production facilities, material supplies etc. permitting). Surveys made by many utility companies tend to indicate that these figures are modest if not actually conservative. This means that approximately ten percent of the homes in the United States will have new washing machines each year. As a result of this activity, ten percent of our customers will have new hot water requirements. It is our duty to insure a proper supply of automatically gas-heated water to permit this electric washer equipment to function at high efficiency. If we are lax in our efforts to provide such adequate hot water service, rest as-

sured the manufacturers of automatic cycle washers will find other ways to guarantee good performance of their product in the homes of our customers. It is equally certain that any alternative method will not be favorable to gas. The electric industry is already predicting a 40 percent increase of electric water heaters over 1941 production and 60 percent increase over their 1946 output. From this you can see that storm warnings are up!

Hot water requirements of the new automatic machines naturally depend on many variables. Among these are size and type of wash, temperature of both hot and cold water, the use of soaking period and water pressure. The latter is a factor in so far as greater or lesser pressure affects the quantity of water used in rinsing. It is appreciated that these variables are highly individual

(Continued on next page)

Aggressive Program Planned for N. Y.-N. J. Sales Conference



J. P. Hanlan



W. B. Hewson

FOR gas company salesmen and sales managers all roads point to the Essex and Sussex Hotel, Spring Lake, N. J., where a high-powered program has been planned for the New York-New Jersey Regional Gas Sales Conference sponsored by the Residential Section of the American Gas Association, June 23 and 24.

Under the leadership of its experienced chairman, J. P. Hanlan, Public Service Electric & Gas Co., Newark, N. J., the conference will devote its attention to aggressive means of gas industry promotion, advertising and selling, in the firm belief that the next ten years will belong to the *salesman*. W. B. Hewson, manager of publicity and advertising, The Brooklyn Union Gas Co., is vice-chairman of the Sales Council.

Mr. Hanlan will open the two-day program with a message entitled "The Gas Industry Looks to the Future," which will be followed by a welcome from H. Carl Wolf, A. G. A. managing director. A feature announced on the advance program is a symposium on the New Freedom Gas Kitchen. Speakers will include H. Vinton Potter, director of the A. G. A. New Freedom Gas Kitchen Bureau, Walter G. McKie, assistant manager of the Domestic Sales Department, Rochester Gas and Electric Co., Martin Gibbons, supervisor of the New Freedom Gas

Kitchen Program, The Brooklyn Union Gas Co., and Evelyn Kirkpatrick, kitchen planning consultant, Boston Consolidated Gas Company.

Mr. Potter will present the new "cashing in" phase of the program; Mr. McKie will discuss the promotion and selling end of the Kitchen Program; Mr. Gibbons will discuss his company's activities in the Kitchen drive, and Miss Kirkpatrick will talk in detail on the participation of home service in her company program.

A surprise feature, described on the advance program as "something brand new that will make the public and competitors sit up and take notice," will be presented by Mr. Hewson on the same day. Another first day feature will be a dynamic message from E. Carl Sorby, vice-president, George D. Roper Corp., on a new slant of the automatic gas cooking campaign.

On Tuesday, June 24, Malcolm R. Rodger, utility sales manager, Bendix Home Appliances, Inc., and Morgan L. Busch, member of the sales staff of Hamilton Manufacturing Co., will discuss features and customer acceptance of the new gas washing machines and automatic gas clothes dryers, respectively. Frank McFerran, general sales manager, Ruud Manufacturing Co., spoke at last year's sales conference and will return for a command performance this year with new ideas on the subject of automatic gas water heating. R. J. Canniff, advertising and sales promotion manager, Servel, Inc., well-known for his achievements in building customer acceptance for gas refrigeration, will present the Servel Refrigeration Program for 1947.

From a vantage point outside the gas industry but right at the center of the selling business, A. C. Fox, Pittsburgh district manager, Fuller Brush Co., will present information and ideas interesting to anyone concerned with sales, salesmen and sales techniques. Subject of his talk will be "There's Gold in Them Thar Doorbells."

and differ from time to time. For example, while hot water temperature may be held within prescribed limits, temperature of cold inlet water fluctuates from season to season and varies with geographic location.

If the users of automatic washers are to get reasonably satisfactory results, they need, according to a Westinghouse Electric Corp. survey, water heaters set to deliver 40 gallons of at least 140° F water at the automatic washer in 80 minutes."

Those recommendations are exclusively for the demand of the automatic cycle washer!

Washer Prospect

Every user of an automatic cycle washer is a potential prospect for an automatic dryer. Here gas has two very distinct advantages. First, the high installation costs for electric dryers, which require special heavy wiring due to the high wattage element employed to do the drying job, put us in a favorable position. Even with an element as large as 4.8 kw, rumors are flying that the electric dryer is slower than the gas model! Second—lower operating costs. With an input of 19,000 B.t.u. in a gas dryer and based on average use of four hours per week with 540 B.t.u. gas at \$1.00 mcf it would cost only \$7.28 a year to do the job, whereas electricity at a rate as low as one cent per kwh would show an annual operating cost of \$9.98 for the same hours of use. The rate applicable to electric dryers is more likely to average two cents per kwh which would raise the operating cost to \$19.96 per year (more than 2.5 times the cost of doing the job by gas). When you natural gas boys convert my manufactured gas figures to natural gas figures, the comparison will be even more favorable to the gas company.

However, we cannot rest on our oars because the subsidy serpent is bound to rear its ugly head and be a powerful factor in the well-organized bid of competitive interests for this lucrative business.

The A. G. A. Water Heating Committee is now actively engaged in an attempt to upgrade all gas water heaters to a point where they will provide adequate hot water service for all home uses as quickly and economically as possible. Here are a few of the recommended performance requirements under discussion:

1. A heater must supply a minimum of 60 gallons of 160 degree water at the heater in the first hour of draw.
2. This performance shall be attained with a

gas consumption not exceeding 1250-1350 B.t.u. per gallon of water heated.

3. Heater must prevent excessive temperature drops due to turbulence and must be capable of delivering 70 percent of its full tank capacity with a maximum drop of 5° in water temperature.
4. The heater must be equipped with a carefully calibrated thermostatic control accurate within limits of 7 percent plus or minus. Such thermostatic control must be located to provide ready, accurate and convenient adjustment by the user.

The Water Heating Committee realized the importance of this program and is pleased to report that progress toward acceptance of these specifications is indicated. Several of the leading manufacturers have already commented favorably on the program and have promised their active support. This Committee is also attempting to develop a simple but accurate sizing chart suitable for use on a national basis by all outlets including neighborhood plumbers.

To the skeptic who still chooses to discount the effect of automatic cycle washers on hot water demands, the next objective of the Water Heating Committee is an advertising campaign to re-educate conventional washer users to draw a tub of clean hot water for each load of clothes! That is what the automatic machine does and that is what we believe the housewife should do with her conventional washing machine. She will be delighted with the improved appearance of her laundry and the increase in gas consumption should be incentive enough for us to get behind such an advertising program with hard cash and the best efforts of our sales and Home Service Personnel.

Provide Adequate Water

One large western utility has a long-standing program of selling nothing less than a 40 gallon storage heater—an example which might well be followed by the balance of our industry. The Pacific Coast Gas Association recommends nothing below a fast-recovery 30 gallon storage heater. There is every indication that even a 30 gallon automatic storage heater will require an input of from 32,000 to 37,500 B.t.u. if it is to provide an adequate quantity of high temperature water for the everyday household requirements of our customers. So—it is time to hang the wreath of mourning on the 20 gallon storage heater and start its funeral procession to the graveyard of obsolescence and inadequacy.

Let us take a look at that favorite word of all sales managers who feel they have done a good job—saturation. We can tear up that book because most of the gas water heaters on our lines today are obsolete and inadequate. They are too small, their ability to recover is too slow and they need a general face-lifting operation in the bargain. Any heater which cannot provide 60 to 75 gallons of 160°F water at the heater during the first hour of draw must be considered inadequate when judged by today's standard of living and modern laundry and dishwashing techniques.

This situation places an additional responsibility on all gas water heater salesmen be-

cause they should size water heaters to fit the requirements of automatic washing machines and dishwashers. In order to do this job intelligently it naturally follows that they should know a great deal about the machines being sold in their communities. The local manufacturer, distributor or dealer should be glad to furnish you with this information since he will welcome an adequate supply of automatically heated water in abundant quantities wherever he installs an automatic clothes washer or dishwasher. It is entirely possible that you can arrange demonstrations with these appliance outlets who can now be justly termed "allies" instead of competitors. A gas water heater salesman should know the hot water requirements per cycle, the time length of each cycle and the water temperature requirements of the various brands of automatic cycle washers and dishwashers. The good salesman will make it his business to learn all he can about the principles of operation, capacities in pounds of clothes, the various types of soaps and detergents recommended and a host of other facts which will help to increase his sales of automatic gas storage water heaters.

Should Be Expert

A really good gas water heater salesman should be something of a laundry expert. There will be a wealth of authoritative material in such publications as the Penn State and V.P.I. Bulletins and the Bendix and Westinghouse Laundry Institute Manuals. Our own Industry has already published and distributed a valuable booklet entitled "Hot Water Magic" which should be considered "must" reading for every gas water heater salesman. With so many trained home laundry experts at hand we will be overlooking a golden opportunity if we do not take advantage of their services for training purposes. It will take time to assemble all the necessary data and boil it down to the facts your salesmen need but it is not too early to begin this task. *It is later than you think!*

The most effective thing gas utilities can do now is to identify gas and gas appliances as the best equipment for home laundries. To accomplish this it is most essential that we ally ourselves closely with the automatic laundry machine. It is a known fact that in the past many gas utilities have had misgivings about promoting anything but gas appliances. However, an increasing number are now planning to display automatic washing machines and it is certainly a most effective way to identify gas as the best way to provide for the laundry load.

I would like to repeat a statement I made more than two years ago. It has been widely quoted and still holds true. "The gas industry collects at least five times as much revenue for heating the water for these automatic clothes and dishwashers as the electric industry receives for providing the power necessary to operate the small fractional horsepower motors which these appliances employ!"

It is impossible to urge, too strongly, that you hook up a modern gas water heater with a sequence washing machine for demonstra-

Egg-otism

The codfish lays a million eggs,
The helpful hen but one,
But the codfish doesn't cackle
To tell you what she's done;
And so we scorn to codfish coy
While the helpful hen we prize,
Which indicates to thoughtful minds
IT PAYS TO ADVERTISE.

—Printer's Ink

tion purposes. Better yet, display a model laundry and include a gas dryer to show the complete picture.

In every community there are numerous washing machine dealers who are, or should be, interested in gas water heaters. Many of these agencies have already indicated their interest in selling gas water heaters. Your company is the only medium in your community which has personnel equipped to train and influence these dealers in proper water heater sales technique, installation practices and good servicing facilities. The gas industry has a golden opportunity to tie-in these dealers with proper gas water heating service now.

The assistance of home service personnel has been enlisted in promoting proper hot water service and the modern laundry program gives them a perfect opening wedge. The A. G. A. Water Heating Committee has among its membership, representatives of Home Service Departments and has recently organized a subcommittee on laundries which also includes home service representation. By this action we hope to take the initiative in this movement and put our industry in the forefront over competitive fuels.

An overall survey taken within the past two years showed that 12 percent gas water heater saturation was the average for manufactured gas companies controlling about 80 percent of the total meters in our country. Many times saturation figures for gas water heaters on natural gas company lines have been quoted and the figures usually mentioned are about 90 percent. Talk of this nature has given me the opinion, perhaps unjustified, that natural gas companies have a feeling of complacency about the water heating load and the importance of adequate sizing, rapid recovery and proper installation. I sincerely trust I am 100 percent wrong, because as I have previously recommended, we should tear up the saturation book and start hard work all over again.

Electric Subsidies

All straight gas companies are only too familiar with the subsidies often employed by straight electric utilities to promote the sale of electric ranges and electric water heaters. If I am not mistaken such a condition exists right here in your own backyard. These subsidies usually offer at least \$25 toward the installation expense of electric ranges and electric water heaters. Properly combated, this condition can be conquered since gas knows no "off-peak" limitations. It provides a 24-hour daily service and, consequently, does not require the installation of greatly oversized storage tanks to counteract charging periods of relatively short duration.

Conversely speaking, we should not be scared into promoting undersized storage heaters especially since gas for water heating still holds the great majority of the high trump cards.

The November issue of *What's New in Home Economics* features a "Hot Water Equipment Section" and shows advertisements for one automatic oil water heater, six electric water heaters and two gas water heaters. The same publication in its October

Gas Kitchen Certification Program Will Spell New Freedom to Housewives

WITH the national home building program far behind schedule, it has become apparent to builders that people want livability and convenience and without these elements homes will go begging. A Long Island builder reports 6,000 new homes remaining unsold in that area alone. Builders are finding it necessary to add many previously omitted conveniences and are grasping in their advertising as never before, nationally advertised products to serve as an endorsement of their building judgment. A number of builders are aware of the fact that homes without attractive kitchens just won't sell.

The New Freedom Gas Kitchen Committee of the American Gas Association, anticipating such a condition, will shortly announce a Certification Program for new construction as well as for home remodeling. National specifications for the New Freedom Gas Kitchen consist of four requirements.

1. The kitchen must be scientifically planned for step-saving, time-saving, work-saving convenience.
2. It must be equipped with an automatic gas range built to "CP" standards.
3. It must contain a silent, automatic gas refrigerator.
4. It must be served by an automatic, quick-recovery gas water heater.

Such a kitchen will certainly spell New Freedom to the housewife.

Because of varying geographic problems, some latitude will be left so that a local company can add to these national requirements other specifications pertinent to the local situation such as ventilation, specific lighting, etc.

For homes meeting the national specifications plus local additions, if any, a Certificate will be issued from the New Freedom



Homes meeting national and local specifications will be awarded this certificate

Gas Kitchen Bureau. This Certificate will serve the consumer as a buying guide and the builder as an endorsement of his judgment in selecting a unified kitchen for his prospect. By inference it will attest to his further good judgment in selecting the materials for the rest of his home.

The program has a broad appeal and is timed to enlist the interest of architects, builders, customers, manufacturers and dealers, adding impetus to the New Freedom Gas Kitchen campaign. Shortages of material will limit the scope of the activity in its early stages but it is hoped that every utility will sponsor a few Certified New Freedom Gas Kitchens right away to gain valuable experience so that when merchandise is increasingly available, mass merchandising of New Freedom Gas Kitchens will become a reality.

Presentation manuals on the program will be distributed soon to all key personnel in the gas industry with additional copies available for dealer distribution at a nominal sum.

issue features a "Modern Laundering Equipment Section" and both articles are well worth the time it will take you to read them. Hot water is certainly receiving more and more attention from all sources but we must capitalize on this publicity.

Hardly a day passes but we read of some new electrical development which makes it tougher for the gas man. Our industry today more than ever demands our best efforts and the most serious thinking of its personnel from top management clear down the line to the doorman. I have heard it said our country could not have survived the recent war without gas and electric refrigeration. When we consider the food shortages and other restrictive effects of the war we can readily accept that statement as more than a theory. Proper hot water service should also be included in all community projects since it is

not a luxury but a downright necessity. Health records of two World's Fairs showed the importance of hot water in preventing the spread of disease and infections in a community. At Chicago the question of sufficiently hot water in public eating and drinking establishments apparently was neglected and mild epidemics resulted. At New York the Health Department insisted on 180° F. water for such establishments and similar epidemics were averted.

I recommend very strongly that you read an article in the December issue of *Woman's Home Companion* entitled "Disease A la Carte" which has the endorsement of Dr. Thomas Parran, Surgeon General, U. S. Public Health Service.

We must size today's automatic gas storage water heaters to the demands of the future.

Industrial & Commercial Gas Section

KARL EMMERLING, Chairman

LEON OURUSOFF, Vice-Chairman

MAHLON A. COMBS, Secretary

Gas Schools Impressive

An eyewitness account of the American Gas Association's Industrial Gas School at Columbus, Ohio, May 5-9, by a gas man who attended but for personal reasons wishes to remain anonymous.

WHEN my boss told me that I was to attend the American Gas Association Industrial Gas School I was both pleased and scared. Although I had been with the gas company for some years, it was only after return from war service that I was assigned to the industrial department as a cadet gas engineer. I knew there was plenty for me to learn about industrial gas, but never thought its application covered such a wide range of businesses, each with its own utilization problems. The course of study bewildered me,



J. C. Dorsey

but as the classes progressed I gradually absorbed the subjects presented by a score or more of top-notch instructors.

Combustion principles and application of combustion equipment were slightly familiar to me, but the theories of heat transfer, heat losses and methods of heat recovery took on a new meaning when they were explained. With copies of the lectures and the data sheets appended, I'm sure I can do a more intelligent selling job to the prospects and customers in my territory.

I was most impressed by the comradeship of gas men. Total strangers, oldsters with years of experience in this industrial gas business literally took me by the hand and explained points on which I was all confused. Between lectures, during recesses and after school, these old-timers went out of their way to help me gain the necessary knowledge that with self-help, will make a gas engineer out of me.

I am grateful to the American Gas Association for this school which has provided ways and means for men like myself to get

much-needed training. When I say it is the greatest and most worthwhile activity undertaken by A. G. A., I am expressing not only my own thoughts, but the collective opinion of all those attending the school. I'd like to do it all over again, and will if given the opportunity.

The above account summarizes The Industrial Gas School sponsored by the Industrial and Commercial Gas Section at the Hotel Seneca, Columbus, Ohio, May 5-9. This school and The Commercial Gas School in Washington which followed filled a need long felt in the gas industry. The comprehensive course of study offered not only a broad basis of fundamentals for the cadet gas engineer, but brought the old timers up-to-date on new techniques and new applications of industrial gas.

Credit should be given to J. C. Dorsey, The East Ohio Gas Co., Cleveland, and his committee who developed the course of study,



Class concentrates as the lecturer illustrates a point



Students at the Industrial Gas School deep in final exams

C. George Segeler, A. G. A. utilization engineer, lecturing a group of students at the Industrial Gas School





Walter S. Anderson, Boston Consolidated Gas Co., chairman for the day, introduces the next lecturer at the Commercial Gas School, held in the gas air-conditioned auditorium of the Washington Gas Light Company



Karl Emmerling, Roy E. Wright and Marcy L. Sperry



Commercial Gas School students find the exams tough going

and secured the many outstanding lecturers on different subjects.

Gas men from 27 states, the District of Columbia, and Canada made up the approximately 150 who attended. They were officially welcomed by C. E. MacQuigg, dean, College of Engineering, Ohio State University. The ballroom of the Seneca Hotel was the classroom and small individual tables were provided for each student with enough room to spread out the lecture material and to make notes during the progress of the lectures. In addition to the platform presentation of subjects, nearly every lecturer supplemented his talk with lantern slides which materially assisted the students. Full use was also made of blackboards for demonstration purposes.

Change of Pace

Relaxation and a change of pace for the students was provided by a get-together dinner on the evening of the fourth day. This dinner was unique in that not a speech was made. The rejuvenating effect of this affair was evidenced by the alertness of students during the last morning session and the way they attacked the formal examination Friday afternoon. The examination provoked much



Chef Alfred Haeringer in a cooking demonstration at Lewis Hotel Training School, Washington

Commercial Gas School students at chef's table, examining cooking demonstration results





Wives of students attending Commercial Gas School sample results of cooking demonstration

favorable comment and was actually a highlight of the course. Individual notes together with the bound file of lectures gave attending students a handbook on industrial gas that will serve them well in their daily work.

Commercial School Covers Many Phases

WITH official greetings from Marcy L. Sperry, president, Washington Gas Light Co., Washington, D. C., The Commercial Gas School got underway in that company's auditorium on May 12, for a week of training on commercial gas. Nearly 100 commercial men from gas companies, equipment dealers, manufacturers, and the liquid petroleum industry, representing 21 states, the District of Columbia, Canada, Cuba and Brazil, met in the utility's gas air conditioned auditorium for most of the sessions, and at the Lewis Hotel Training School on two afternoons and one evening.

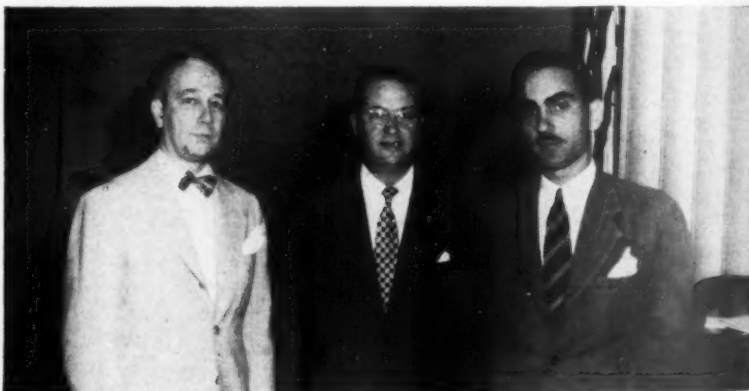
The course of study developed by Roy E. Wright, Negea Service Corp., Cambridge, Mass., covered every phase of the food service industry. Practically every piece of gas equipment utilized in the preparation, cooking and serving of food in volume was covered in detail. Planning of kitchens, lay-outs and modernization was discussed in detail by experts in their respective fields. Competitive fuels and the computation of their respective costs was one of the most interesting presentations. Also popular was a study of the many phases of selling including market analyses and surveys.

The highlight of the school was a cooking demonstration at the Lewis Hotel Training School by Alfred Haeringer, a former chef and Washington restaurant owner. He prepared a "dinner" with a running commentary. On completion he had: four roasted chickens, one with stuffing inside, and three

with dressing prepared separately; creamed spinach, cream of spinach soup, whipped duchess potatoes and a minute steak with special sauce. The proper method of preparation was described in detail together with the various uses of the gas equipment for different foods. The demonstration closed with the audience learning that the proof of the pudding is in the eating.

A good fellowship get-together dinner was held at the Hotel Burlington on the fourth evening for everyone attending the school. On the following day after the morning session, an examination was held.

The consensus of opinion was that the knowledge gained at the Commercial Gas School will be of greatest value to gas company representatives who contact the volume cooking field to promote efficient use of gas fuel, a better understanding of the varied uses of gas cooking equipment and the economical aspects of utilizing specialized equipment for special cooking operations.



The international touch at the Commercial Gas School. Left to right: Miguel Luis Vera, Havana, Cuba; Carmelo Calabria, Rio de Janeiro, Brazil, and Emilio Nunez Cancio, Havana

Detroit Official Suggests City-Financed Incinerators

ERNEST JONES, new commissioner of public works, Detroit, Michigan, recently suggested that the city finance all or part of the cost of installing incinerators in each home. If every home had an incinerator, the city could lop millions off its annual tax budget, he stated.

Commissioner Jones proved his point by having an incinerator installed in his own home for study purposes and, although, his family of six managed to accumulate a normal amount of rubbish, he found that with the incinerator, it took a whole month to accumulate a small pan of flake ash and a small box of tin cans, bottles and jars.

He suggested that a method of financing could be worked out whereby the city would purchase and install these appliances, paying for them out of the savings realized in the cost of rubbish collection.

Largest Angle Compressor

PRODUCTION of the largest gas engine-driven angle compressor in the world, expected to effect substantial savings in installation and piping costs in the natural gas transmission and processing industries, is now under way in the Mount Vernon, Ohio, plant of The Cooper-Bessemer Corporation.

Five of the new giant units, known as the "Type GMW," have been ordered by the Panhandle Eastern Pipeline Co., Chicago, to meet unprecedented demands for natural gas in the Eastern and Mid-Western industrial areas.

Designed for the gas transmission and natural gas processing industries they are expected to find widespread demand because of potential savings offered in reduction of installation, piping, foundation, and other building and servicing costs. The user's estimates indicate savings in installation costs ranging from six to 12 dollars per horsepower.

Technical Section

C. S. GOLDSMITH, Chairman

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Gas Flows Through U.G.I. Gum Filters

BY EDWARD H. SMOKER

*The United Gas Improvement Co.,
Philadelphia, Pa.*

IN the early 1930's members of the Research Department staff of The United Gas Improvement Co. published a series of papers which described in some detail the method of formation of vapor phase gum in manufactured gas and some procedures for substantially reducing the amount which gets into the distribution system. Unfortunately, however, it is practically impossible to eliminate it entirely and the need for a filter to protect the rapidly increasing number of automatic appliances has become apparent. After studying a wide variety of materials the U.G.I. Gum Filter* was developed and first made commercially available to the gas industry in 1934.

Protective Devices

Recognizing the need for protection against gum, the American Gas Association set up "American Standard Listing Requirements for Gum Protective Devices," ASA Z21.35-1945, effective January 1, 1946, covering their construction and gum removal characteristics. It further specified that A. G. A. listed gum protective devices "shall be provided for constant burning gas pilots on appliances and accessories for use in manufactured gas," effective January 1, 1946, except for water heaters on which the effective date was January 1, 1947. U.G.I. filters meet these American Standard specifications and are now standard equipment on many appliances having A. G. A. certification.

Because of the widespread use of gum filters a description of their physical characteristics which determine gas capacity, believed to be of interest to gas engineers, is developed in this article.

Since flow of gas can be either streamline or turbulent, depending on whether the magnitude of the

filter. Since the filter is not an empty tube to which the Reynolds number applies, strictly speaking, the diameter cannot be estimated with accuracy. The filter packing in effect divides the filter into a number of tubes, not necessarily straight, through which the gas flows in a series of parallel streams. Since the effective average diameter of these tubes is unknown, the overall filter diameter is chosen in order to obtain the maximum value for the Reynolds number. The largest filter being marketed at the present time has a diameter of about five inches, so this value is used.

The linear gas velocity is determined by the gum filtering characteristics of the filter packing and the allowable pressure drop through the filter. Limitations on the former are set by the necessity for passing stringent tests developed by U.G.I. and the A. G. A. Laboratories, while the latter cannot exceed one-half inch of water according to American Standard requirements. The gas density for manufactured gas seldom exceeds 0.7, while air, on which filter capacities are based, is of course 1.0. The viscosities of manufactured gases are in the neighborhood of 150 micropoises at ordinary temperatures while that of air is 182 micropoises. Changing these quantities to a consistent set of units so that the Reynolds number can be expressed as a dimensionless constant, its maximum value for the conditions applicable to gas flow

through filters is about 260 or far below the threshold value for turbulence of 2100. Hence it follows that the flow characteristics through a gum filter conform to the laws for streamline rather than turbulent flow, and should follow Poiseuille's equation.

$$\frac{V}{t} = \frac{\pi p r^4}{8 l \mu} \quad (2)$$

All factors in equation (2) are well defined and measurable except "r." As stated before, the filter can be considered to be made up of a series of tubes of undetermined radius in parallel. This radius varies with packing density and therefore by controlling the packing density it is possible to make the volume rate of gas flow, "V/t," vary directly with cross-sectional area normal to the direction of gas flow. Equation (2) then changes to equation (3), which is the practical one for characterizing gas flow through filters.

$$\frac{V}{t} = \frac{K_p A}{l \mu} \quad (3)$$

Measurements have been made showing the practical as well as the theoretical applicability of equation (3) in determining gas flow characteristics. For a filter of given diameter the direct variation of "V/t" with "p" and its inverse variation with "l" and "μ" have been experimentally proven.

The A. G. A. rating for gum protective devices is expressed in cubic feet of air per hour at one-half inch pressure drop. Therefore to determine the capacity of such a device, the A. G. A. rating of which is fixed, it is only necessary to know the allowable pressure drop and the viscosity of the gas to be filtered.

Under certain conditions,† specified by A. G. A., the allowable pressure drop is one inch of water rather than the half-inch involved in the A. G. A. rating. In these cases the air capacity is twice the A. G. A. rating.

The viscosity of a gas can be computed from those of its individual components using the formula of Zipperer and Hernung‡

$$\mu_m = 1.03 \frac{n_1 \mu_1 \sqrt{M_1} + n_2 \mu_2 \sqrt{M_2} + \text{etc.}}{n_1 \sqrt{M_1} + n_2 \sqrt{M_2} + \text{etc.}} \quad (4)$$

In Table I are shown the viscosities of the various components present in city gases.

Joint Conference

A full account of the Joint Chemical and Production Conference, sponsored by the Technical Section of the American Gas Association, will be carried in the July-August MONTHLY. The conference is being held at the Hotel New Yorker, New York, June 2-4, with a program centered around general sessions and popular round-table conferences.

*Made by a number of manufacturers according to specifications of and under Patent License from U.G.I.

TABLE I
VISCOSITIES OF GASES

Gas	μ at 20° C in Micropoises ($\text{poise} \times 10^6$)
H ₂	88
N ₂	174
O ₂	201
Air	181
H ₂ O	98
CO	174
CO ₂	146
CH ₄	110
C ₂ H ₄	101
C ₂ H ₆	94
C ₃ H ₈	90
C ₄ H ₁₀	86
C ₆ H ₆	76

† "Manufacturers specified capacities of gum protective devices shall be not less than the rated capacities of the burners with which they are used, except that where a pilot is taken off the gas supply line ahead of any regulatory devices, it is permissible, in the case of gas protective devices using filter material, to apply a rating twice the manufacturers' rating."

‡ Gas und Wasserfach 79, 49-54, 69-73 (1936).

In Table II are given the details of a calculation for the viscosity of an average Philadelphia city gas.

TABLE II
VISCOSITY OF PHILADELPHIA GAS

Component	n	M	μ	$n \sqrt{M}$	$n \mu \sqrt{M}$
H ₂	.407	2	88	.57	50
CO	.174	28	174	.92	160
CH ₄	.155	16	110	.62	68
C ₂ H ₆	.010	30	94	.05	5
Illuminants					
(C ₂ H ₄)	.077	28	101	.41	41
CO ₂	.039	44	146	.26	37
O ₂	.008	32	201	.05	10
N ₂	.130	28	174	.69	120
Total	1.000			3.57	491

μ for Philadelphia Gas = $1.03 \times 491/3.57$
= 138 micropoises

Computed in the same manner from gas analyses Table III shows the estimated viscosities for the gases distributed in various cities.

TABLE III
VISCOSITIES OF VARIOUS CITY GASES

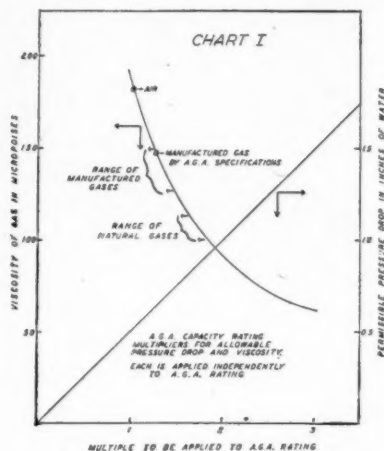
City	Type of Gas	μ (Micropoises)
Philadelphia	Manufactured	138
Baltimore	"	142
Brooklyn	"	140
New York	"	147
Boston	"	128

Compared with air, filters passing these manufactured gases will have from 23 to 31 percent more capacity at the same pressure drop. The American Standard requirements for filters allow a 25 percent increase in capacity beyond the A. G. A. rating on air to compensate for the reduced viscosity.

Since the U.G.I. filter will remove sub-

stantially all the gum present in manufactured gas, it should also remove dust and any other particles which are present. Therefore the filter should have considerable utility in natural gas situations. Due to its lower viscosity the rate of flow of natural gas for the same pressure drop is much higher than that of manufactured gas.

In Chart 1 are shown graphically the mul-



tipliers to be applied to the A. G. A. rating for

(a) allowable pressure drop (right-hand scale)

(b) gas viscosity (left-hand scale).

Each multiplier is applied independently of the other. It should be borne in mind that although a range of viscosity multipliers is given for various manufactured gas viscosities, American Standard requirements only permit the application of a 1.25 value as indicated on the Chart. For natural gas use these requirements have set up no limitations as yet, so the viscosity multiplier can be read directly from the viscosity curve.

NOMENCLATURE

- d Diameter of circular tube
- v Linear gas velocity through tube
- ρ Gas density
- μ Gas viscosity
- t Time
- p Pressure drop through tube
- r Radius of circular tube
- l Length of tube
- V Gas volume
- K Proportionality constant
- A Cross-sectional area of filter
- n Volume fraction of component in gaseous mixture
- M Molecular weight of component in gaseous mixture
- Sub m refers to gaseous mixture
- Sub 1, 2, etc. refers to individual component of gaseous mixture

Research Reports Approved

THE Technical Advisory Group for Burners, Controls and Accessories Research of the Committee on Domestic Gas Research of the American Gas Association has approved for publication a report by the A. G. A. Laboratories on effects of ambient pressures in combustion chambers and assigned to the Laboratories for editing and

publishing a report on gum, dust and rust filtering prepared by the Arthur D. Little Inc. organization, and based on A. G. A. sponsored research which they conducted.

The pressure report rounds out research studies conducted on effects of both ambient temperatures and pressures on primary air injection, flame and other gas burner operating characteristics undertaken as part of the gas burner research program conducted at the Laboratories. Temperature effects were reported in Research Bulletins Number 26, "Primary Air Injection Characteristics of Atmospheric Gas Burners," Number 34, "Temperature as a Factor in the Design of Aerated Gas Burners," Number 37, "Primary Air Injection Characteristics of Atmospheric Gas Burners, Part II," and Number 38, "Fundamental Data for Design of Totally Aerated Atmospheric Gas Burners."

The gum, dust and rust filtering report reviews existing literature on the subject, summarizes the results of field contacts and studies, appraises the problem generally and makes specific recommendations for continued research.

Accident Prevention Techniques Illustrated

A SPECIAL showing of accident prevention films was presented for the headquarters staff of the American Gas Association on May 19, in conjunction with a meeting of the A. G. A. Committee on Accident Prevention, H. T. Jayne, The Philadelphia Gas Works Co., chairman. H. Carl Wolf, A. G. A. managing director, presided at the meeting, and in introductory remarks emphasized the importance of safety work.

Two films supplied by E. C. Baumann, Public Service Electric and Gas Co., Newark, N. J., a member of the Accident Prevention Committee, illustrated the latest techniques in prone pressure and pole top resuscitation. Joseph D. Napoli, The Brooklyn Union Gas Co., gave a demonstration of multiple application of the Schafer Prone Pressure method. A film entitled "A Day With A Street Construction Crew" was shown, with accompanying comments by C. S. Goldsmith, The Brooklyn Union Gas Co., and chairman, A. G. A. Technical Section.

At the close of the meeting Mr. Jayne and A. Gordon King, secretary of the Technical Section, spoke briefly on accident prevention.

England Gets Slogans

IN a competition for the best slogan summing up the urgent need for economy in gas consumption in Hereford, England, the first prize went to a woman for the slogan: "Wives of Hereford—Husband your gas." The second prize was also won by a woman with: "To speed recovery—Go slow with gas." Third prize was won by a man who sent in: "Be on your mettle—Watch light, fire and kettle." The competition judges were the editors of two local newspapers and the prizes were presented by the Mayor of Hereford.

Gas-Making Qualities of Oils

FOUR empirical methods have been used in recent years at the Harrison Gas Works Laboratory of the Public Service Electric & Gas Co. for evaluation of the gas making qualities of oils:

1. Bliss and Kugel's method outlined before the American Gas Association Chemical and Production Conference in 1940 (see Figure 1).
2. A modification of the above method to correct the average "H" value to a boiling point of 600° F. (see Figure 2).
3. Cauley and Degass' method based on viscosity and specific gravity published in A.G.A. MONTHLY, November 1945, and delivered before A.G.A. Chemical and Production Conference, June 1946 (see Figure 3).
4. Kugel's method of combining the "H" value and the iodine number with the second power of the specific gravity of the oil (see Figure 4).

The following tables and graphs show the results of the four methods compared to the cracking test yields on 50 samples of oils and light tars ranging from 56.3° A.P.I. to 3.4° A.P.I.

BY W. F. KUGEL

Public Service Electric and Gas Co.,
Harrison, N. J.

On the four graphs, assuming that the straight black line at a 45° angle represents perfect agreement between the cracking tests and the chemical evaluations, then the numbered points show the actual test data. The closer the points are to the line the more dependable is the formula.

The original Bliss-Kugel method based on heavy oils tends to give low results on light oils.

The modified method gives a better balance between the high side and the low side.

Cauley and Degass' method is more rapid but gives a similar wide band.

Kugel's new method gives a much narrower band and therefore more consistent results. This improvement in reliability is shown numerically in the table for various groups of oils.

Diff. between Cracking Test and Method in M-B.T.U.'s	No. 2		No. 3		No. 4	
	±3	over 3	±3	over 3	±3	over 3
First 15 samples 3.4-13.8 A. P. I.	9	6	7	8	9	6
Second 15 samples 14.0-23.8 A. P. I.	6	9	6	9	11	4
Third 15 samples 24.4-34.9 A. P. I.	3	12	5	10	9	6
Last 5 samples 35.1-56.3 A. P. I.	4	1	1	3	5	0
	22	28	19	30	34	16
No. 4 Method gives best percentage in each group						
Average deviation from cracking test for the 50 samples						
	4.58		4.63		2.63	

Fig. A. Comparison of methods 2, 3 and 4

Sample No.	A. P. I.	M-B.T.U.'s Cracking Test	M-B.T.U.'s Bliss-Kugel	Diff.	M-B.T.U.'s Modified Bliss-Kugel	Diff.	M-B.T.U.'s Cauley-Degass	Diff.	M-B.T.U.'s Kugel	Diff.
1	3.4	61.5	57.0	-4.5	62.0	+0.5	66.0	+4.5	64.0	+2.5
2	4.1	60.5	59.5	-1.0	63.5	+3.0	70.0	+9.5	56.5	-4.0
3	5.5	71.5	68.5	-3.0	71.5	0.0	63.0	-8.5	82.0	+10.5
4	10.7	85.0	71.5	-13.5	74.0	-11.0	89.0	+4.0	78.5	-6.5
5	12.1	81.0	78.0	-3.0	77.0	-4.0	83.0	+2.0	84.0	+3.0
6	12.3	84.0	84.0	0.0	87.5	+3.5	92.0	+8.0	88.0	+4.0
7	12.3	97.0	90.0	-7.0	94.0	-3.0	92.5	-4.5	94.0	-3.0
8	12.4	100.0	94.0	-6.0	97.5	-2.5	92.5	-7.5	100.0	0.0
9	12.5	94.5	91.5	-3.0	96.0	+1.5	93.5	-1.0	98.0	+3.5
10	12.5	82.5	78.5	-4.0	82.0	-0.5	94.0	+11.5	83.5	+1.0
11	12.6	97.0	90.0	-7.0	93.0	-4.0	95.0	-2.0	97.0	0.0
12	13.3	97.5	95.5	-2.0	108.0	+10.5	95.0	-2.5	95.5	-2.0
13	13.4	97.0	88.0	-9.0	91.0	-6.0	96.0	-1.0	92.5	-4.5
14	13.5	99.0	97.0	-2.0	101.5	+2.5	97.0	-2.0	100.0	+1.0
15	13.8	95.0	92.0	-3.0	96.0	+1.0	96.0	+1.0	95.0	0.0
16	14.0	99.5	95.5	-4.0	99.5	0.0	97.0	-2.5	99.5	0.0
17	14.6	102.0	92.0	-10.0	94.5	-7.5	95.0	-7.0	94.5	-7.5
18	15.1	99.0	91.5	-7.5	94.0	-5.0	100.0	+1.0	99.0	0.0
19	15.3	114.5	108.5	-6.0	111.0	-3.5	104.0	-10.5	113.0	-1.5
20	15.3	114.5	102.5	-12.0	104.5	-10.0	102.0	-12.5	111.0	-3.5
21	15.4	106.5	99.0	-7.5	101.5	-5.0	103.0	-3.5	106.5	0.0
22	16.0	98.5	96.5	-2.0	100.5	+2.0	99.5	+1.0	98.5	0.0
23	16.2	105.0	105.0	0.0	108.0	+3.0	104.0	-4.0	109.0	+4.0
24	16.7	104.5	94.0	-10.5	96.5	-8.0	100.5	-4.0	105.0	+0.5
25	17.2	95.0	97.0	+2.0	100.0	+5.0	103.0	+8.0	99.0	+4.0
26	17.7	95.0	86.5	-8.5	90.0	-5.0	100.0	+5.0	94.0	-1.0
27	19.3	113.5	115.5	+2.0	116.0	+2.5	115.5	+2.0	114.0	+1.5
28	21.6	109.0	115.0	+6.0	118.0	+9.0	113.0	+4.0	111.0	+2.0
29	23.7	100.0	93.0	-7.0	97.5	-2.5	100.0	0.0	100.5	+0.5
30	23.8	115.0	117.5	+2.5	118.5	+3.5	108.5	-6.5	113.0	-2.0
31	24.4	98.0	87.0	-11.0	90.0	-8.0	90.5	-7.5	96.5	+1.5
32	24.5	105.5	109.5	+4.0	112.0	+6.5	108.5	+3.0	106.0	+0.5
33	25.0	100.5	85.5	-15.0	88.5	-12.0	102.0	+1.5	98.0	-2.5
34	25.0	98.0	85.0	-13.0	88.0	-10.0	103.0	+5.0	97.5	-0.5
35	25.8	92.0	94.5	+2.5	97.5	+5.5	101.0	+9.0	98.5	+6.5
36	25.8	97.5	89.5	-8.0	92.5	-5.0	101.0	+3.5	99.0	+1.5
37	25.9	99.5	92.0	-7.5	95.5	-4.0	105.0	+5.5	103.0	+3.5
38	26.1	105.0	97.5	-7.5	101.0	-4.0	102.0	-3.0	96.0	-9.0
39	26.4	99.5	90.5	-9.0	93.5	-6.0	101.0	+1.5	101.0	+1.5
40	27.0	100.5	90.5	-10.0	93.5	-7.0	103.0	+2.5	106.0	+5.5
41	27.3	110.0	97.0	-13.0	104.5	-5.5	104.0	-6.0	103.5	-6.5
42	28.0	119.0	119.5	+0.5	119.5	+0.5	128.0	+9.0	119.5	+0.5
43	29.4	103.0	99.0	-4.0	100.0	-3.0	96.0	-7.0	103.0	0.0
44	31.0	110.0	118.5	+8.5	118.5	+8.5	104.0	-6.0	116.0	+6.0
45	34.9	105.0	107.5	+2.5	108.0	+3.0	101.5	-3.5	106.5	+1.5
46	35.1	122.0	119.0	-3.0	119.5	-2.5	126.5	+4.5	121.5	-0.5
47	35.3	111.5	117.0	+5.5	110.5	-1.0	108.0	-3.5	112.5	+1.0
48	40.1	112.5	119.5	+7.0	119.5	+7.0	101.5	-11.0	121.0	+8.5
49	48.9	122.0	120.0	-2.0	120.0	-2.0	124.0	+2.0	122.0	0.0
50	56.3	123.0	120.0	-3.0	120.0	-3.0			122.0	-1.0

Fig. B. Fifty samples, arranged in order of A.P.I.

Sample No.	A. P. I.	Sp. Grav. @ 60° F.	Vis. @ 122° F. Say. Furol Sec.	Flash Point P. M. °F.	Pour Pt. °F.	Conradson Carbon	% Sulphur By Wt.	Alkal. % Na ₂ CO ₃	% Cl. as NaCl	Hanus I Number
1	3.4	1.0489	98	250	35	14.0	.68	.002	.003	52.7
2	4.1	1.0435	92	240	30	13.6	.71	.002	—	56.1
3	5.5	1.0328	112	230	20	12.1	.77	.001	.083	45.6
4	10.7	.9951	131	226	40	12.7	.62	.001	.021	48.7
5	12.1	.9854	23	216	below 0	4.9	.33	.002	.064	45.1
6	12.3	.9840	127	184	60	11.8	.79	.001	.011	46.0
7	12.3	.9840	114	184	40	11.5	1.35	.002	.014	47.2
8	12.4	.9833	95	192	35	10.6	2.23	.002	.014	41.9
9	12.5	.9826	112	208	35	11.5	1.36	.002	.012	45.1
10	12.5	.9826	103	218	40	11.6	.81	.002	—	46.1
11	12.6	.9820	91	194	40	11.0	2.03	.002	.010	42.9
12	13.3	.9772	143	204	20	8.1	.43	.002	.010	45.8
13	13.4	.9765	109	198	40	10.9	1.01	.001	.015	46.1
14	13.5	.9759	200	210	35	8.1	.46	.002	.019	40.3
15	13.8	.9738	100	220	40	8.9	.62	.002	.012	43.7
16	14.0	.9725	128	245	30	7.8	1.01	.003	.006	41.1
17	14.6	.9685	103	245	20	9.9	.93	.001	.014	44.3
18	15.1	.9632	63	176	25	9.6	1.09	.002	.019	40.3
19	15.3	.9629	106†	415	70	10.3	.47	.002	.027	29.1
20	15.3	.9629	179	175	40	11.3	3.7	trace	.011	30.2
21	15.4	.9632	117	235	45	8.7	1.94	.001	.006	32.9
22	16.0	.9593	69	194	25	4.5	.46	.002	—	39.4
23	16.2	.9580	175	235	55	7.2	.76	.259	.058	31.7
24	16.7	.9548	48	200	30	11.2	.98	.006	.058	32.9
25	17.2	.9516	56	204	45	6.3	.79	.002	.018	38.5
26	17.9	.9471	18	204	20	6.2	.94	.001	.013	45.1
27	19.3	.9383	393	450	65	8.8	1.09	.002	.008	26.7
28	21.6	.9243	50	450	5	.37	.31	—	—	27.6
29	23.7	.9117	65*	172	35	.04	1.09	—	—	32.4
30	23.8	.9111	288*	405	0	.18	.07	—	—	25.7
31	24.4	.9076	—	—	—	.43	1.08	—	—	36.4
32	24.5	.9071	121*	225	75	1.7	0.18	.019	.029	30.8
33	25.0	.9042	59*	162	35	.31	.88	.001	.002	32.9
34	25.0	.9042	63*	150	35	.42	.98	.001	.004	34.5
35	25.8	.8996	53*	158	10	trace	1.37	.001	.014	36.8
36	25.8	.8996	52*	150	25	.3	.82	—	—	34.2
37	25.9	.8990	61*	164	25	.18	1.06	.002	.004	32.3
38	26.1	.8978	51*	184	25	trace	1.25	—	—	37.9
39	26.4	.8961	49*	170	15	.4	.86	—	—	32.8
40	27.0	.8927	48*	150	35	.3	1.00	—	—	28.1
41	27.3	.8911	51*	150	58	trace	.36	—	—	26.7
42	28.0	.8871	27	490	90	.98	.70	.002	.004	17.8
43	29.4	.8794	35*	178	10	trace	.22	—	—	27.7
44	31.0	.8708	40*	190	below 0	.01	.04	—	—	20.9
45	34.9	.8504	33*	146	0	trace	.24	—	—	27.9
46	35.1	.8493	64*	216	56	trace	—	—	—	14.5
47	35.3	.8483	35*	138	below 0	trace	.28	—	—	23.1
48	40.1	.8246	30*	120	below 0	trace	0.0	—	—	15.2
49	48.9	.7844	31*	133	below 0	trace	0.0	—	—	6.3
50	56.3	.7535	27*	below 62	below 0	trace	0.0	—	—	7.5

*Vis. @ 100° F. S. S.
†Vis. @ 210° F. S. F.

Table 1. Physical Tests

Chemical Evaluation of Petroleum Oils to Determine Enriching Value

Several methods have been developed in recent years for rapid and accurate determination of the enriching value of a gas oil. Although the laboratory cracking test has been generally accepted as the most reliable method, it lacks complete dependability. Due to the fact that its procedure has never been standardized and too many factors depend on the manipulation of the apparatus by the operator, the results are not always consistent.¹ The high cost of equipment, larger space requirements and the longer time consumed for the test also contribute to its lack of general application.

All theoretical evaluations of gas oils are based on the cracking test. By comparing the test results of a large number of samples with the yield as determined by the cracking test, one can establish a curve which will give good results for all oils, providing the empirical method employed permits a wide range of application.

The procedures developed in the past have proven very useful for certain groups of oils but have failed to cover a broad field.

The proposed new method is designed to be applicable to oils of widely divergent characteristics. This method checks within a

range of plus or minus three percent of the cracking test results (average calculated efficiency is 2.63 percent for 50 samples).

The cracking tests used in this comparison were made in an electric furnace with hydrogen as the base gas.

The empirical value is determined by the following expression:

$$X = \frac{100 d^2}{H \times I}$$

d = spec. grav. @ 60° F. of the original oil sample

$H^{(2)}$ = av. H value of uncracked distillate⁽³⁾

$I^{(4)}$ = Hanus Iodine number using A.S.T.M. method D555-41 except that 15 ml of Hanus solution is taken.

Experimental tests have shown that pure paraffins and pure naphthenes have low iodine numbers, pure aromatics react slightly with Hanus solution while unsaturates react readily.

There is a general relationship between the average H value and the iodine number, both increasing simultaneously. For straight run products or pure saturated compounds the H value is sufficient for the evaluation. Due to development of the newer refining processes such oils are seldom available for gas-making purposes and have been supplanted by recycle stock or cracking still residuum.

These latter oils created a problem for chemical evaluation since they contain more unsaturated compounds. Unsaturates, when cracked at gas making temperatures, give a very low yield. They either break down to carbon and hydrogen or are converted into aromatics to form the by-product tar. Therefore a correction must be made to adjust the empirical value in proportion to the degree of unsaturation.

Since dark oils and tars can be tested without difficulty, the iodine number is selected as the quickest and most practical method of determining the unsaturates.

"H," the average dispersion of the uncracked distillate, is obtained with a refractometer by determining the refractive index and drum reading. Both values are combined in the Dispersion Table of the Spencer Refractometer in the formula:

$$H = Nt - Nc = A - KBS$$

"A" and "B" are values corresponding to the refractive index and "S" is a value corresponding to the drum reading. "K" is the correction factor for the individual refractometer. These values are given in the "Dispersion Table" supplied with the instrument. In general the lower the "H" value, the better the quality of an oil.

A high refractive index and low drum reading indicate a poor quality, a low refractive index and high drum reading indicate a very

Sample No.	F. D.	10%	20	30	40	50	60	70	80	90	100	T. U. D.	R. & L.	% Coke
1	390	610	636	638	664	678	679					60	29.5	24.2
2	428	604	660	680	683	697	698					60	22.5	21.3
3	420	592	618	636	648	656	664					60	24.0	21.2
4	400	610	642	652	655	656	657	658				70	18.5	18.8
5	208	528	568	608	634	640	646	652	660	84/666		70	18.5	18.8
6	354	618	626	636	646	646	646	646				72	15.0	13.2
7	328	600	618	622	622	624	630	634	74/650			74	18.0	17.8
8	418	628	640	656	656	656	657	660				70	18.0	16.6
9	247	584	608	616	620	622	626	636	74/642			74	15.4	—
10	292	604	622	634	639	640	642	643	72/643			72	17.0	17.1
11	380	610	624	628	628	630	636	640				70	17.0	15.6
12	476	624	629	631	631	636	640	646	72/649			72	15.0	13.2
13	368	601	638	642	657	658	659	659				70	17.0	16.2
14	428	636	638	638	642	642	644	653				70	15.5	13.8
15	392	630	638	638	640	640	642	652				70	15.0	13.9
16	374	612	618	621	626	629	635	638	654			80	12.0	12.3
17	376	632	638	640	640	643	645	650	74/656			74	13.5	14.1
18	328	582	614	632	632	636	646	646	74/646			74	16.0	15.4
19	566	628	630	631	632	635	647					70	16.5	—
20	340	590	622	632	635	638	640	647	73/644			73	14.0	11.3
21	396	614	626	636	638	638	640	647	648			80	16.0	13.7
22	372	616	630	636	632	633	634	640	652			80	9.0	8.9
23	392	608	614	618	618	620	628	636	658			80	13.0	11.6
24	302	600	640	658	658	659	660	660	658			80	14.5	14.0
25	380	626	630	632	632	632	636	644	654			80	12.0	10.5
26	268	538	584	618	638	642	642	644	648	87/652		87	9.0	8.3
27	556	630	634	632	640	640	648	655	648			80	6.0	—
28	538	646	648	652	655	657	666	674	694	720		90	1.0	—
29	320	546	586	612	624	640	652	664	680	700		90	1.0	trace
30	526	668	676	680	684	688	696	702	716	732	94/740	94	.5	—
31	340	540	590	625	646	668	686	702	730	740	94/760	94	.6	1.1
32	356	576	604	626	636	650	656	664	668			80	4.5	4.2
33	345	529	583	621	643	652	678	690	706	724		90	1.0	.8
34	354	522	582	621	644	658	679	689	90	713		90	.5	1.0
35	297	490	534	578	608	630	650	670	688	88/696		88	1.0	.3
36	320	513	567	600	618	632	652	667	716			90	1.0	—
37	316	484	530	584	604	640	668	684	698	712		90	1.5	.6
38	336	516	555	587	597	632	648	668	694	87/704		87	1.0	trace
39	322	486	538	582	610	627	644	656	678	708		90	.5	—
40	284	464	514	564	600	626	640	656	676	700		90	trace	—
41	394	604	616	628	640	646	652	660	670	686		90	.5	trace
42	566	604	626	632	636	636	640	648	660	660		90	4.0	—
43	400	482	496	509	520	532	544	556	570	588	610	100	0.0	—
44	328	478	497	512	530	546	564	586	626	654	676	100	—	—
45	280	400	412	428	447	471	495	516	542	576	99/610	99	.5	trace
46	388	606	630	648	656	676	684	696	716	730	99/756	99	0.5	—
47	323	430	442	466	474	504	522	538	562	596	97/620	97	1.0	—
48	324	350	355	362	370	379	388	400	412	432	484	100	—	—
49	324	355	368	384	400	420	436	456	482	504	518	100	—	—
50	156	224	230	236	243	256	266	280	298	324	340	100	—	—

F. D.—First Drop
T. U. D.—Total Un-cracked Distillate
R. & L.—Residue and Loss

Table 2. Distillation °F

good quality oil. As the refractive index increases the oil quality drops and as the drum reading increases the oil quality rises and vice-versa.

The physical tests and data necessary for the evaluation of 50 different samples are listed in Tables 1, 2, and 3.

The curve for the determination of the yield in M-B.t.u.'s per gallon of oil may be plotted from the following data:

X	Y
60	50.0
80	60.5
100	71.5
120	82.0
140	91.0
160	97.0
180	101.0
200	104.0
220	107.0
240	109.0
260	111.0
280	112.5
300	113.5
340	115.5
380	117.0
420	119.0
500	121.0
1000	122.0

This data is plotted on the curve in Figure 5.

Conclusion

The cracking test cannot be relied upon completely. Since it serves as a basis for comparison in all evaluations one cannot expect a perfect check. This formula gives very satisfactory results checking on the average within 2.63 percent.

The variable factors in this formula are determined by standard methods and the results can be duplicated.

The advantage of this formula is that it may be applied to oils whose physical characteristics vary considerably as indicated by the A.P.I. which ranges from 3.4-56.3.

The experimental tests also verify that crude oils or narrow cuts may be evaluated with this formula.

Time consumed is much less than the cracking test and is somewhat shorter than the Bliss-Kugel formula, especially when used on light colored oils.

Appendix

Note (1)—See report of A.G.A. Production & Chemical Conference Subcommittee Report 1931.

Note (2)—H value as determined by the refractometer.

Quoting from a Bausch and Lomb pamphlet on the refractometer. "The refractive index of a material may be defined as the

bending power of the material for a ray of light on its surface." Mathematically the index of refraction is equal to the sine of the angle of incidence divided by the sine of the angle of refraction, but this value for the wave length of sodium light may be read directly by means of the refractometer. The dispersion (H) is the difference between the bending of the F-line of the hydrogen spectrum which has a wave length of 4861 Angstrom units and the bending of the C-line of the hydrogen spectrum which has a wave length of 6563 Angstrom units. This quantity (H) is sometimes written (N_F-N_C) to indicate that it is the difference between the refractive indices of the F-line and the C-line. It is determined from tables supplied with a refractometer after measuring the degree of drum rotation required to eliminate the color band which occurs when light is passed through a prism. Quoting again from the same pamphlet, "the amount of this bending expressed as refractive index is a characteristic property of materials and may be used for the purpose of identification."

Distillation Method

Note (3)—The distillations for this investigation were made with a Church flask and air-cooled condenser. The Church distillation is best suited for gas oils because the shield around the flask is draft free and waxy oils do not congeal in the condenser. The distilling rate is held to one drop per second. Fractions may be collected in 10 ml portions and the dispersion determined for each fraction,

Sample No.	A. P. I.	Sp. Grav. @ 60° F.	I	R. I.	Drum	H	X	M-B.T.U.'s Cracking Test
1	3.4	1.0489	52.7	1.565	31.7	.02400	86.5	61.5
2	4.1	1.0435	56.1	1.563	32.4	.02301	73.1	60.5
3	5.5	1.0328	45.6	1.541	35.0	.01928	121.5	71.5
4	10.7	.9951	48.7	1.522	35.7	.01801	112.8	85.0
5	12.1	.9854	45.1	1.532	36.5	.01708	126.0	81.0
6	12.3	.9840	46.0	1.508	37.3	.01567	134.7	84.0
7	12.3	.9840	47.2	1.500	38.4	.01389	147.5	97.0
8	12.4	.9833	41.9	1.499	38.8	.01338	172.0	100.0
9	12.5	.9826	43.1	1.501	38.6	.01364	164.0	94.5
10	12.5	.9826	46.1	1.516	36.5	.01682	124.5	82.5
11	12.6	.9820	42.9	1.500	38.2	.01417	159.0	97.0
12	13.3	.9772	45.8	1.500	38.6	.01362	152.6	97.5
13	13.4	.9765	46.1	1.502	37.9	.01457	141.9	97.0
14	13.5	.9759	40.3	1.502	38.8	.01332	177.0	99.0
15	13.8	.9738	43.7	1.505	38.2	.01426	152.0	95.0
16	14.0	.9725	41.1	1.497	38.7	.01342	171.0	99.5
17	14.6	.9685	44.3	1.501	38.2	.01419	149.1	102.0
18	15.1	.9632	40.3	1.489	38.4	.01369	168.0	99.0
19	15.3	.9629	29.1	1.477	40.0	.01121	284.0	114.5
20	15.3	.9629	30.2	1.481	39.7	.01171	261.0	114.5
21	15.4	.9622	32.9	1.489	39.3	.01244	226.0	106.5
22	16.0	.9593	39.4	1.504	38.3	.01411	165.0	98.5
23	16.2	.9580	31.7	1.489	39.5	.01216	238.5	105.0
24	16.7	.9548	32.9	1.493	38.6	.01353	204.5	104.5
25	17.2	.9516	38.5	1.495	38.3	.01394	168.8	95.0
26	17.9	.9471	41.0	1.508	37.8	.01492	146.5	95.0
27	19.3	.9383	26.7	1.467	40.3	.01058	311.0	113.5
28	21.6	.9243	27.6	1.488	39.9	.01159	266.5	109.0
29	23.7	.9117	32.4	1.506	38.1	.01443	178.0	100.0
30	23.8	.9111	25.7	1.492	40.1	.01140	283.0	115.0
31	24.4	.9076	36.4	1.506	38.0	.01452	156.0	98.0
32	24.5	.9071	30.8	1.490	39.3	.01245	214.0	105.5
33	25.0	.9042	32.9	1.503	37.5	.01517	164.0	100.5
34	25.0	.9042	34.5	1.502	37.7	.01492	158.5	98.0
35	25.8	.8996	36.8	1.498	38.9	.01321	166.0	92.0
36	25.8	.8996	34.2	1.501	38.3	.01399	169.0	97.5
37	25.9	.8990	32.3	1.497	38.9	.01317	190.0	99.5
38	26.1	.8978	37.9	1.496	38.5	.01368	155.6	105.0
39	26.4	.8961	32.8	1.498	38.5	.01361	179.8	99.5
40	27.0	.8927	28.1	1.494	38.8	.01323	214.0	100.5
41	27.3	.8911	26.7	1.502	37.5	.01520	195.2	110.0
42	28.0	.8871	17.8	1.462	40.6	.01005	439.0	119.0
43	29.4	.8794	27.7	1.497	37.7	.01482	187.6	103.0
44	31.0	.8708	20.9	1.476	40.7	.01022	354.0	110.0
45	34.9	.8504	27.9	1.475	39.4	.01201	215	105.0
46	35.1	.8493	14.5	1.467	40.8	.00981	506	122.0
47	35.3	.8483	23.1	1.469	39.9	.01112	279	111.5
48	40.1	.8246	15.2	1.451	41.0	.00925	484	112.5
49	48.9	.7844	6.3	1.434	41.3	.00849	1150	122.0
50	56.3	.7535	7.5	1.422	41.7	.00763	991	123.0

I=Hanus Iodine Number
R. I.=Refractive Index
Drum=Drum Rotation
H=

Table 3. Chemical evaluation

or the distillate may be collected in a 100 ml graduate and the dispersion determined on the total distillate.

It may be desirable to obtain boiling points

Work Easily

● Many people who work hard do it easily. The secret of turning out a great deal of work lies in doing it with as little wear and tear on the nervous system as possible. The man who likes what he is doing seldom feels the burden of it—it is a pleasant recreation to him. After all, there isn't much difference between working hard and playing hard except one's attitude of mind.

If one's work is drudgery, the drudgery is self-imposed—it is not in the work itself. He works best who keeps his mind free from the thought of being ground down by the task, who keeps his spirits light and buoyant, who lives simply and refuses to be stampeded into a mad rush for diversion and thrills. There is a thrill and diversion in living a simple, well-ordered life, in being master of one's job.

—New England News.

and dispersions of the 10 ml fractions, since the plotting of these values will show whether the oil is a straight run distillate, a blend or a cracked product. This added information is not essential for the evaluation of the yield for gas making purposes. Only the uncracked distillate is collected for the H value determination. The distillation is stopped when a heavy brown fog appears in the flask or the typical odor of cracked oil is noticed.

Note (4)—Hanus Iodine Number.

A.S.T.M. D-555-41.

The A.S.T.M. method is followed closely but a few minor changes had to be made to assure better accuracy on this type of oil.

Procedure:

Between 0.18-0.20 grams of oil are weighed in a glass-stoppered 250 ml iodine flask. 10 ml of chloroform is added to dissolve the oil. Then 15 ml of Hanus solution is added with a pipette, the flask stoppered, agitated and let stand in a dark place for exactly 30 minutes, after which ten ml of 15 percent potassium iodide solution is added to prevent the bromine from escaping or reacting any further on the sample.

The unused portion of iodine is then titrated with 0.1N sodium thiosulfate solution. A small amount of starch is added near the end to obtain a distinct endpoint. The burette reading is subtracted from a blank and

the iodine number calculated as centigrams of iodine per gram of oil.

$$I = \frac{cc \times 1.269}{wt. of sample}$$

Reagents for Hanus Iodine Number

1. Chloroform.
2. Hanus Solution.

It is advisable to prepare the Hanus solution in the laboratory. 13.2 grams of resublimed iodine are dissolved in one liter of warm glacial acetic acid. The solution is filtered, cooled and a blank is determined.

For 15 ml solution titrated with 0.1N sodium thiosulfate the blank will be close to 15 ml. Then enough concentrated bromine is added to the iodine solution to exactly double the burette reading of the former blank (app. 3.0 cc Br₂). To facilitate adding the correct amount of bromine, it is advisable to dissolve five ml bromine in 20 ml glacial acetic acid and then add 15 ml of that solution to the Hanus solution. The new blank will run close to 30 ml sodium thiosulfate.

The Hanus solution must be kept in a dark-colored and glass-stoppered bottle and stored in a dark place to prevent loss of bromine and iodine and also retard the formation of the halogen acids.

3. Potassium iodide (15 percent solution).
4. .1N Sodium Thiosulfate solution.

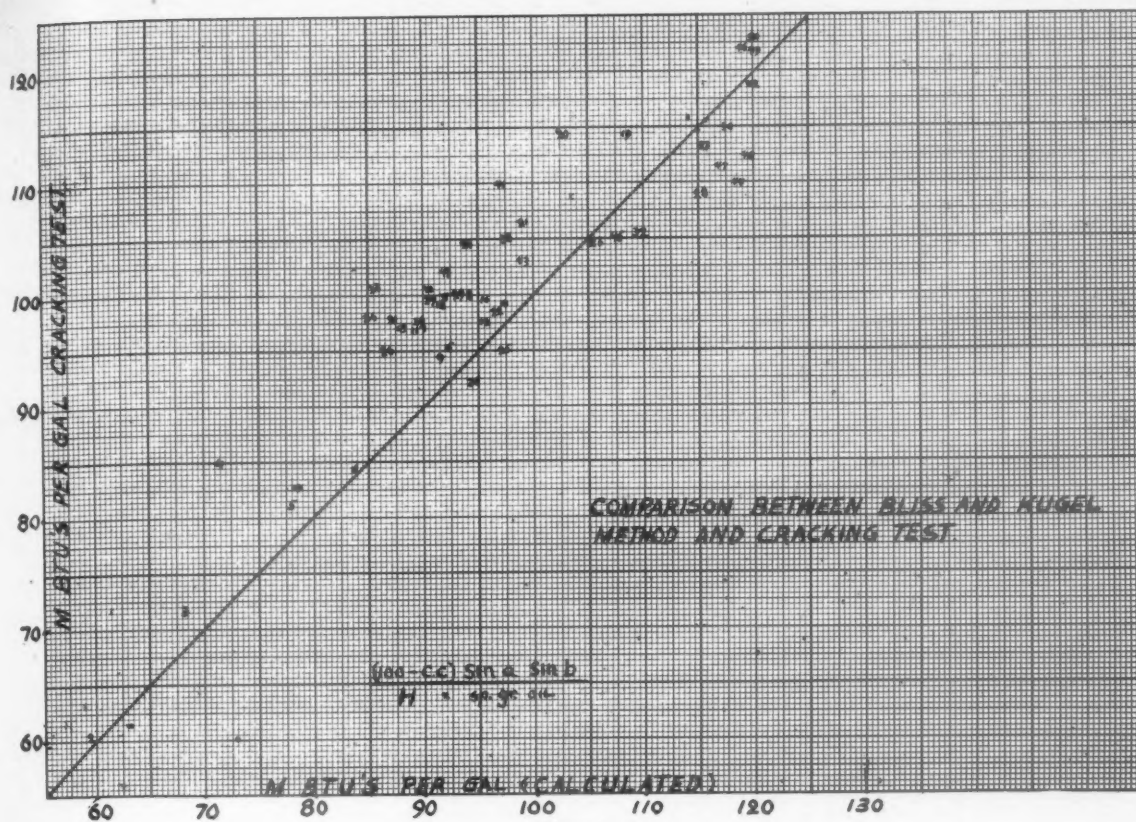


Figure 1

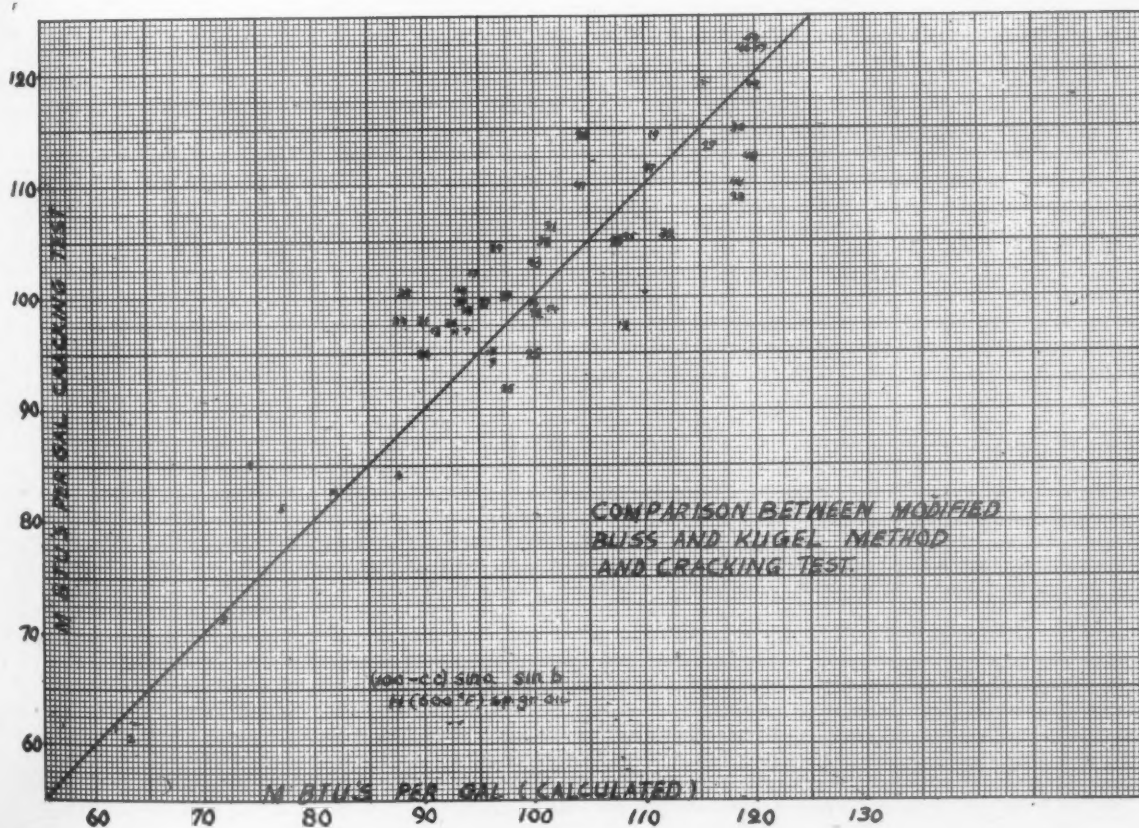


Figure 2

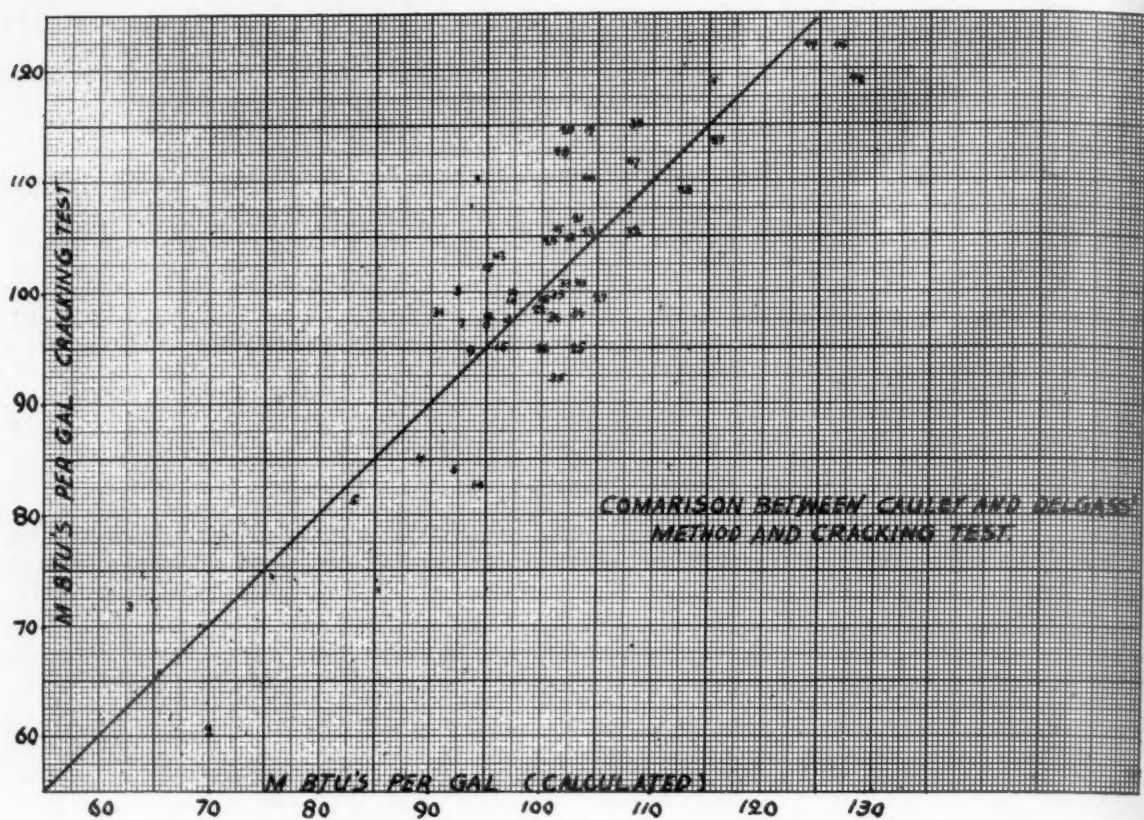


Figure 3

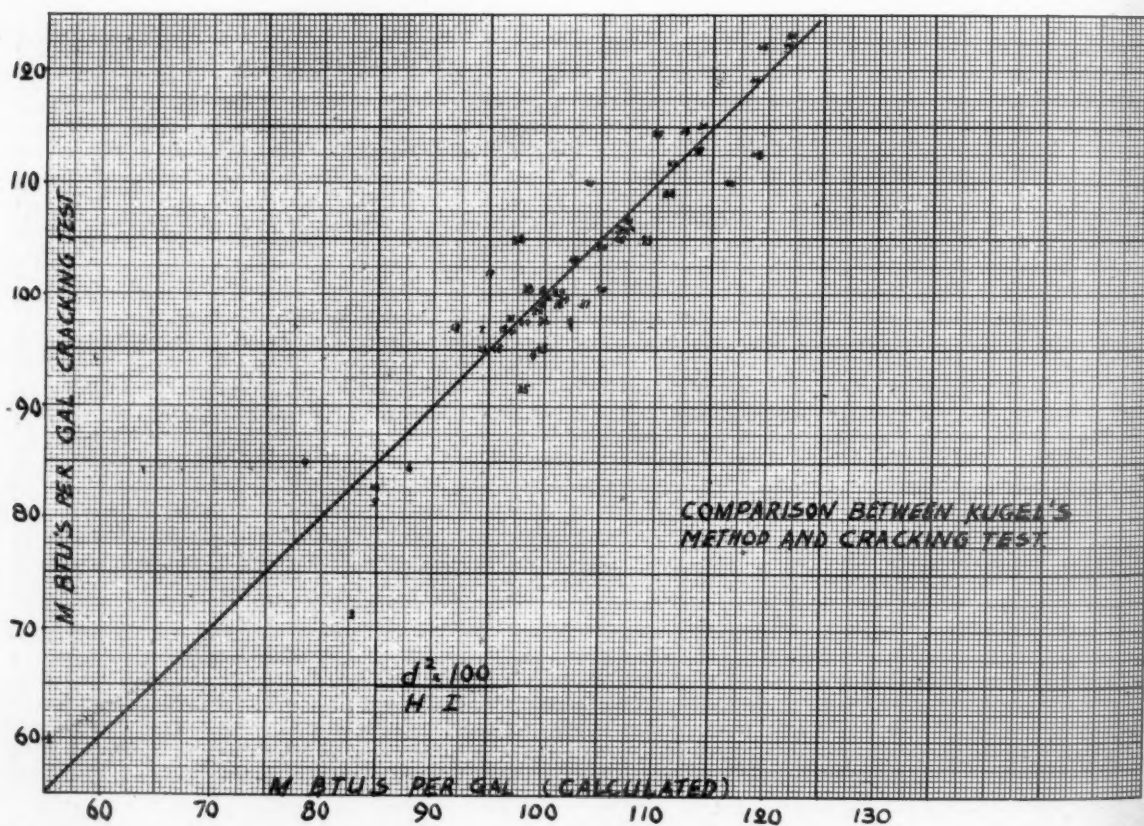


Figure 4

Cleveland Concern to Build Soviet Gas Plant

A CONTRACT has been signed by John B. O'Connor, executive vice-president, Dresser Industries, Cleveland, Ohio, for the construction in Moscow of one of the largest gas liquefaction plants in the world.

The plant, which should be completed by autumn 1949, will cost approximately \$6 million, Mr. O'Connor announced. It will be

built under the direction of three American engineers, will liquefy four million cubic feet of natural gas a day and provide storage for 4,610,000 cubic meters or 162 billion cubic feet of gas.

The gas will be taken from the Moscow-Saratov pipe line and stored in liquid form to be used for peak loads and stand-by service.

Gas from the Saratov field, on the Volga about 475 miles southeast of Moscow, first was piped into that city last year.

WRITE THE WAY YOU TALK

(Continued from page 287)

7. Avoid any note of impatience or sarcasm.
8. Be sure to answer all of the questions the customer asks.
9. Be sure that your words are short and natural so that the average person will know their meaning.
10. Try to get out of the "groove" and have the letter sparkle with originality.
11. Make a diligent effort to have interest sustained from the start to the end of the letter.
12. View the entire letter as a good will builder for the company (if the letter might tear down good will in your opinion, don't sign it, write another one—a better one).
13. Remember that the letter is you *talking*—not just writing.

"Write the way you talk—customers like it"—you will too!

Hartford Displays New Gas Appliances



The Hartford Gas Company exhibit at the Builders Show, held in that city, April 26-May 3. The show attracted an attendance of 12,800 and the exhibit featured many new gas appliances

Texas Eastern Takes Over Big Inch Line

TEXAS Eastern Transmission Corp. took over from Tennessee Gas and Transmission Co., Houston, Texas, operation of the Big Inch pipeline system on May 1. Included are 2,815 miles of 24-inch and 20-inch line for transmission of natural gas from Texas to the East Coast.

Meanwhile, United Gas Pipe Line Co., Shreveport, La., has received F.P.C. authorization to sell gas to Texas Eastern for a nine-month period beginning May 1.

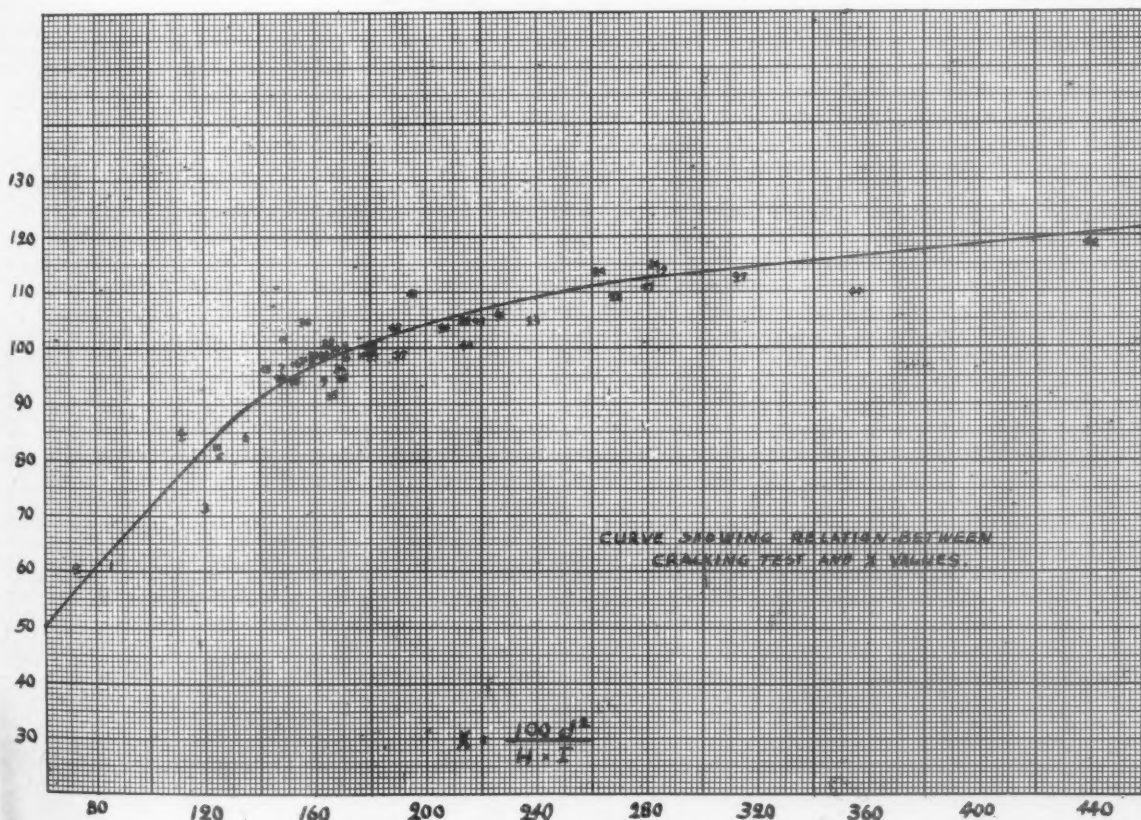


Figure 5



Laboratories

ARTHUR F. BRIDGE, Chairman

R. M. CONNER, Director

A. G. A. Laboratories Has Interested Visitors

OF particular interest to delegates who visited the American Gas Association Testing Laboratories in Cleveland during the A. G. A. Motor Vehicle and Distribution Conference, April 14-16, was the storage of test gases and the miniature generator and carburetor recently-installed for producing various types of manufactured gases for use in mixed gas research. About 75 visitors from the conference took the trip through the Laboratories.

An interested recent visitor was T. Westerdijk of Holland, in this country for several months to study American use of gas appliances utilizing LP-gases. Mr. Westerdijk spent several days at the Laboratories discussing test methods and comparing notes on advanced research in the LP-gas field. He is a consulting engineer for DeBataafsche Petroleum interests in Holland, a Dutch Shell

affiliate which operates a testing and research laboratory in Broekmolenweg, Delft, and maintains its own approval requirements quite similar to those employed at the Laboratories.

Requirements Groups Active

RECENT activities by American Gas Association requirements committees center on standards for domestic ranges and central heating appliances.

A revised procedure for wall and floor temperature tests adopted by the gas range requirements subcommittee was subsequently approved by the Approval Requirements Committee and will become effective January 1, 1948.

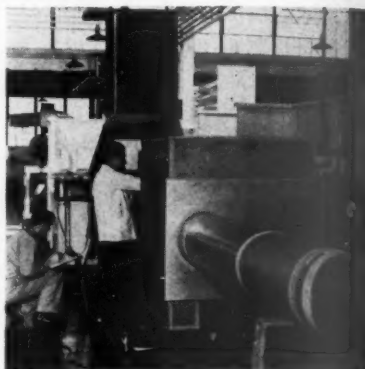
A special sub-group, appointed to modernize and streamline gas range requirements, has completed its assignment, subject to consideration by the entire committee, completely reviewing current requirements at its April meeting. Evaluating each provision against concepts of (1) safety, (2) construction, (3) performance and (4) serviceability, a number of construction as well as performance features were deleted and others modified. Consolidation of a number of requirements provisions were effected to reduce the number of tests and consequently the size of the standards. It is estimated that adoption of the recommendations would reduce the text approximately 35 percent.

A number of requirements contained in "Standards for Boilers, Warm Air Furnaces, and Conversion Burners Used on Manufactured Gas," as modified by representatives of eastern utilities and manufacturers, have been reviewed by the Cleveland Working Committee of the A. G. A. central heating requirements subcommittee. Definite requirements will be prepared for further consideration by the main group.

Revised Constitution, By-Laws Available

The new Constitution and By-Laws of the American Gas Association, including the amendments which a large majority of the membership approved by mail ballot during the poll which closed April 1, 1947, has been printed and a copy will be sent to members on request.

Testing Central Heating Equipment



Testing Duct Type Furnace at Los Angeles A. G. A. Laboratories. Rated at 440,000 B.t.u. per hour, the furnace is one of the largest submitted for test. Central heating equipment has led all other types of appliances in test work this year. Many models are approved for use with LP-gases as well as city gases.

Pennsylvania Natural Gas Firms Entertain Teachers



Guests of The Manufacturers Light & Heat Co., The Peoples Natural Gas Co. and Equitable Gas Co., at a dinner in Pittsburgh, April 17, were 175 home economics teachers from junior and senior high schools and colleges in the area. Natural gas company representatives at the speakers' table include Irving K. Peck, W. L. Hutcheson, Flora Dowler, The Manufacturers Light and Heat Co.; Ray Little, Kathryn Barnes, Equitable Gas Co.; John Jacobs, Charles A. Yost, Ruth Severson, The Peoples Natural Gas Company.

Personal and Otherwise

Hoenigmann Resigns



F. J. Hoenigmann

FRANK J. HOENIGMANN has resigned as executive vice-president and a director of Florence Stove Co., Chicago, effective June 30. Mr. Hoenigmann was recently elected first vice-president of the Gas Appliances Manufacturers Association.

A graduate engineer of the University

of California, he served during World War I as Aide-de-Camp to General Hugh S. ("Iron Pants") Johnson. Following the war he went with General Johnson to the Moline Plow Co., Moline, Ill., where during ten years of service in different positions, he became general superintendent and works manager.

In 1930 he entered the gas industry as sales manager of Cribben & Sexton Co. and in 1940 was made vice-president and general manager which position he held until retirement early in 1946.

Mr. Hoenigmann is past chairman of the Domestic Gas Range Division of G.A.M.A. and a director of that association.

Dashiell Retires, Becomes Gas Consultant



P. T. Dashiell

PHILIP THORNTON DASHIELL has retired as vice-president in charge of production, The Philadelphia Gas Works Co. and is now associated with United Engineers & Constructors, Inc., Philadelphia, as consultant on synthesis and city gas processes. He has been chairman of the Gas Production Research Committee of the American Gas Association since the Committee was originally appointed in 1944.

Mr. Dashiell entered the service of The

Philadelphia Gas Works in 1899 as a cadet engineer and was transferred to the Public Service Electric & Gas Co., N. J., as assistant engineer of the Essex Division in 1904 and engineer of manufacture in 1910. He was transferred back to The Philadelphia Gas Works in 1913 as assistant engineer of works, serving in that position until 1926 when he became engineer of works. In 1932 he was appointed vice-president in charge of production, in which capacity he continued until his retirement on May 1, 1947.

He has always been interested and active in the development of production processes in the manufactured gas industry and is primarily responsible for the U.G.I. Heavy Oil Process which permits the use of heavy residuum oils in the manufacture of carburetted water gas, one of the most important developments economically in the industry. For this work and for other contributions he was awarded the Beal Medal by the American Gas Association and the Walton Clark Medal by the Franklin Institute. He is also the author of numerous papers on various technical aspects of the manufactured gas industry.

He is a past-president of the Society of Gas Lighting, a past-president of the Pennsylvania Gas Association, a registered engineer of the State of Pennsylvania, and a director of the Chamber of Commerce and Board of Trade of Philadelphia.

Morse Heads Industrial Editors' Council



C. J. Morse

CHARLES J. MORSE, editor of *Gas News*, the Peoples Gas Light and Coke Company's employee publication, was elected president of the International Council of Industrial Editors, at the organization's annual convention in St. Louis, May 15.

The International Council consists of 30 editors' associations located in principal cities throughout the United States and Canada. Mr. Morse has just completed his term as president of the Editors Association of Chicago, and as first vice-president of the Council.

Florence Appoints Vice-President

ROBERT H. TAYLOR was elected vice-president in charge of sales of Florence Stove Co. at a recent meeting of the Board of Directors. Mr. Taylor succeeds Harvey E. Golden who died in January.

Mr. Taylor, formerly general sales manager, has been associated with the Florence sales organization for 15 years, a good portion of this time as manager of the New York Sales Division. His headquarters is at the home office in Gardner, Mass.

Philadelphia Works Makes Personnel Changes



J. V. Postles

HUDSON W. REED, president, Philadelphia Gas Works Co., has announced important personnel changes in the company's organization effective May 1, including the appointment of John V. Postles to succeed Philip T. Dashiell as vice-president in charge of production (Mr. Dashiell's retirement is covered in a separate story on this page).

Mr. Postles is a past-chairman of the Technical Section of the American Gas Association and has been active in that section for many years. Formerly he was engineer of works at the Philadelphia company and has been Mr. Dashiell's assistant since 1938.

Mr. Postles was born in Smyrna, Del. in October 1890, and was graduated from Delaware College in 1911 with a Bachelor of Science Degree in Civil Engineering. His first position was with the U. G. I. Company on plant appraisal work at Omaha and Kansas City. Later he became an engineer with U. G. I. in Philadelphia on experimental work directed at developing a more efficient gas making process. In January 1914, he began his service with The Philadelphia Gas Works Co. in the Distribution Department, and later became a special engineer on utilization of industrial gas appliances. Between 1918 and 1925 he was an engineer on gas production at both the Point Breeze and Port Richmond plants. In 1925, he became assistant to the Engineer of Works who was then W. H. Gartley, later assistant to the vice-president in charge of production, and subsequently engineer of works.

Other changes include the appointment of H. D. Lehman, active in the A. G. A. technical section and formerly manager of the Customers' Service Department, succeeding Mr. Postles as engineer of works, and the appointment of H. L. Robbins to succeed Mr. Lehman. A new division created within the production department is headed by T. F. Clark, formerly Superintendent of the Point Breeze works, with the title of engineer of control. His assistant is S. C. Symnoski. Harry E. Hodgson is the new superintendent at the Point Breeze plant.

Behling Nominated to F.P.C.

PRESIDENT Truman nominated Burton N. Behling of Washington, D. C., on May 5 to be a member of the Federal Power Commission for the remainder of the term expiring June 22 and for a full term expiring June 22, 1952. Mr. Behling, special assistant to F.P.C. and director of its natural gas investigation, will succeed Richard Sachse, F.P.C. vice-chairman, who is resigning because of ill health.

Ohio Fuel Gas Fills Vice-Presidencies



W. N. Grinstead



E. C. Overbeck

WN. GRINSTEAD, company treasurer, and E. C. Overbeck, Production Department manager, were elected vice-presidents of The Ohio Fuel Gas Co. at the annual meeting of stockholders and directors in Columbus, O., on May 6.

They succeed to vice-presidencies vacated by E. M. Tharp, general manager, who had resigned effective May 1 to enter the public relations field, and by P. S. Clapp, who has been transferred to New York City with the Columbia System. Duties of Mr. Grinstead and Mr. Overbeck will not parallel those formerly fulfilled by Mr. Tharp and Mr. Clapp.

C. I. Weaver was re-elected president and also was elected general manager. Mr. Grinstead, also re-elected as treasurer, now supervises distribution and sales. Mr. Overbeck, in his new position, supervises all mechanical operations except distribution.

Ohmer Ullrey, manager of General Accounting, and J. S. Phillips, manager of Purchasing and Stores, were elected new assistant treasurers.

Tharp Leaves Ohio Fuel Gas Company



E. M. Tharp

EM. THARP, prominent in the gas industry for many years, retired on May 1 from his position as vice-president and general manager of The Ohio Fuel Gas Co., Columbus, Ohio, to head his own company, E. M. Tharp Associates, Columbus, which specializes in human relations as applied to American business.

Active in the American Gas Association, Mr. Tharp is chairman of the Publicity and Advertising Committee and a Director of the Association. During the past year he has headed the large publicity program initiated as a part of the Association's accelerated research and promotion drive.

He was formerly financial editor of the Ohio State Journal, Columbus, in which ca-

pacity he wrote articles condemning certain practices of the old Columbus Gas and Fuel Co., and when that utility was acquired by the Pure Oil Co., was appointed to correct some of the operational faults which he had described. He was later named promotion manager of the Pure Oil Co. where he put into effect many of the promotional and merchandising ideas he had previously formulated.

When the utility properties of the Pure Oil Co. were acquired by the Columbia system, Mr. Tharp joined The Ohio Fuel Gas Co. which represented an amalgamation of more than 100 local gas properties. He has been an employee of that company since 1927, assistant to the president since 1930, and general manager since 1932. Mr. Tharp has been instrumental in installing numerous departments and improvements at The Ohio Fuel Gas Co. including the development of underground storage facilities for approximately 25 billion cubic feet of gas.

Mitchell Named Director of U. S. Chamber



D. H. Mitchell

THE Chamber of Commerce of the United States has announced the election of Dean H. Mitchell, president, Northern Indiana Public Service Co., Hammond, Ind., as a director to represent District Five, comprising Michigan, Indiana, Ohio and Kentucky.

Mr. Mitchell is at present a director and formerly served two terms as president of the Indiana State Chamber of Commerce. He is well-known in the utilities field, having served on various committees of the American Gas Association, is a director and past-president of the Indiana Gas Association and also the Indiana Electric Association.

He has been president of the Northern Indiana Public Service Co. since 1938 and is also president of the Hobart Light and Water Co.; Shore Line Shops and the LaPorte Heat Corporation.

Reelected directors were two other utility representatives: Richard K. Lane, president, Public Service Co. of Oklahoma, Tulsa, to represent the Seventh Election District, and Powell C. Groner, president, Kansas City Public Service Co., the Transportation and Communication Department.

Jones Appointed By Bendix

JOHAN PAUL JONES, Marion, Ohio, has been appointed chief engineer for Bendix Home Appliances, Inc., South Bend, Ind., according to W. F. Oliver, vice-president and director of engineering, who had held the post in connection with his administrative duties since the war. Mr. Jones has wide experience in machine and tool design, development and production engineering.

Wolf Named Manager



F. N. Wolf

FN. WOLF has been appointed manager, Planning and Development Department, Equitable Gas and Pittsburgh and West Virginia Gas Companies, D. P. Hartson, vice-president and general manager for the companies, announced recently. Mr. Wolf will supervise the operations of the Planning and Development Department, and will be responsible for the compilation and continuous review of construction and operating budgets and other company statistics. His offices will be at 435 Sixth Avenue, Pittsburgh.

Mr. Wolf entered the employ of the Equitable Gas Co., October 9, 1922, as a fieldman. He has served successively as gas measurement engineer, field engineer, distribution supervisor, research engineer, assistant to operating manager, and assistant to the vice-president and general manager prior to his present appointment.

Dresser Elects Reimer



R. E. Reimer

RUDOLPH E. REIMER, secretary and treasurer of Dresser Industries, Inc., Cleveland, Ohio, was elected a vice-president of the company at a meeting of the Board of Directors in New York, April 22.

Mr. Reimer, a native of Cincinnati, attended public schools there and graduated

from the University of Cincinnati in 1928 with the degree of Commercial Engineer. He has been associated with Dresser interests since 1929, when he became controller of Dresser Manufacturing Co., Bradford, Pa., now an operating division of Dresser Industries, Inc. He became treasurer of that organization in 1932 and in 1943 was elected secretary and treasurer of Dresser Industries, Inc.

He is a vice-president and director of the Bryant Heater Co., and officer and director in many other Dresser units.

Colorado Appointment

AROY MOORE has been appointed heating contractors' representative for the Public Service Co. of Colorado, Denver.

Mr. Moore has an enviable record with the company, having sold gas appliances and house heating equipment for nearly 20 years. Before that he was the sales representative for the American Radiator Company.

Associated Organization Activities

Wisconsin Association Elects Brenner



E. C. Brenner

FROM fellowship student in manufactured gas research at the University of Wisconsin to president of the Wisconsin Utilities Association, which sponsored the fellowship, is the distinction that has come to Erwin C. Brenner, vice-president in charge of operation, Milwaukee Gas Light Co., who

was recently elected president of the utilities association, succeeding B. E. Miller, Madison, secretary, Wisconsin Power & Light Company.

Brenner was the first fellowship student selected by Prof. Otto Kowalke under the research sponsorship of the association in 1919. He graduated from the College of Engineering at the University in June, 1919 with a B.S. degree in chemical engineering. In 1920 he was engaged by the Milwaukee Gas Light Co. in its production department, having previously worked in their plants during vacation periods while attending the University. He participated in a consulting engineering mission for the Russian government in 1931.

C. G. A. Convention Plans Approach Final Stage

LATE reports indicate a record attendance for the fortieth Annual Convention of the Canadian Gas Association at the General Brock Hotel, Niagara Falls, Ontario, June 9-11.

According to advance notices the following papers and addresses will be included among the program highlights:

"Gas Manufacturing Trends in North America," by George F. Knight, general superintendent of works, Consumers' Gas Co. of Toronto; "Customer Service Trends," by Schuyler F. Baldwin, operations supervisor, Gas Distribution Department, Rochester Gas & Electric Corp., Rochester, N. Y.; "A Practical Approach to Home Service," by Miss Inez Somers, Director of Home Service Depart-

ment, Consumers' Gas Co., Toronto; "Employee Training Plans of the American Gas Association," address by George H. Smith, assistant managing director and director, Natural Gas Department, American Gas Association, New York.

Also scheduled are "The Manufacturer's Responsibility in the Utility Business," by John A. Robertshaw, president, Robertshaw Thermostat Co., Youngwood, Pa.; "The 'CP'

Programme for 1947-1948," by James I. Gordon, "CP" promotional director, Gas Appliances Manufacturers Association, New York; "Specialty Selling in the Canadian Market," by James H. Welsh, divisional manager, Electrolux (Canada) Ltd., Toronto; motion picture film entitled—"Safe Practices in Street Main Work," with comments by C. S. Goldsmith, engineer of distribution, The Brooklyn Union Gas Co., Brooklyn.

G. A. M. A. Lists 1947-48 Division Chairmen

LEADERS in the gas industry appointed to head special projects and divisions of the Gas Appliance Manufacturers Association in connection with the 1947-1948 expansion program, have been named by Harold Massey, assistant managing director of the Association, following the annual meeting in Chicago recently.

The following chairmen will spearhead various G.A.M.A. activities: Controls and Related Accessories Division—John A. Wolff, sales manager, Milwaukee Gas Specialty Co.; Direct Heating Equipment Division—George H. McFadden, president, The Ohio Foundry & Manufacturing Co., Steubenville, O.; Domestic Gas Range Division—A. B. Ritzenthaler, vice-president, The Tappan Stove Co., Mansfield, O.; Gas House Heating and Air Conditioning Equipment Division—C. B. Phillips, vice-president and sales manager, Surface Combustion Corp., Toledo, O.; Gas Refrigerator Division, Louis Ruthenburg, president, Servel, Inc., Evans-

ville, Ind.; Gas Valve Division—R. L. O'Brien, president, Detroit Brass & Malleable Works; Gas Water Heater Division—Frank J. Nugent, general manager, Appliance, Sales, Rheem Manufacturing Co., New York.

Also the following chairmen: Hotel, Restaurant, and Commercial Gas Equipment Division—W. H. Rudolph, president, Savory Equipment, Inc., Newark, N. J.; Industrial Gas Equipment Division—Herman Gehrich, Jr., vice-president, Gehrich & Gehrich, Inc., Woodside, N. Y.; "CP" Manufacturers Group—E. Carl Sorby, vice-president, Geo. D. Roper Corp., Rockford, Ill.; Gas Boiler Group—L. H. Hobson, manager automatic heating sales, General Electric Co., Bloomfield, N. J.; Gas Conversion Burner Group—E. A. Weaver, sales manager Space Heating Division, Surface Combustion Corp., Toledo, O.; and the Gas Furnace Group—Gene Brown, sales manager, Morrison Steel Products, Inc., Buffalo, N. Y.

Southwest Gas Course Proves Popular

REGISTRANTS from 26 states, Mexico and Venezuela attended the twenty-second annual Southwestern Gas Measurement Short Course at the University of Oklahoma, Norman, Oklahoma, May 6-8. Six hundred students registered during a single one hour period.

The course is sponsored annually by the University of Oklahoma College of Engineering; the Oklahoma Corp. Commission; Kansas Corp. Commission; Arkansas Oil and Gas Commission; Oklahoma Utilities Association; American Gas Association, Natural Gas Department; the Natural Gasoline Association of America; and the Southern Gas Association.

R. M. Scofield, Lone Star Gas Co., Dallas, general chairman, opened the general assembly on the first morning. D. A. Hulcy, president, Lone Star Gas Co., in the principal address of the morning, delivered an inspirational talk on "Development of the Natural Gas Industry." Wednesday and Thursday morning sessions were devoted to discussion of subjects relating to gas measurement regulations control. George Greiner, Phillips Petroleum Co., was chairman of the committee which arranged comprehensive educational

exhibit for those attending the Short Course.

E. C. McAninch, Oklahoma Natural Gas Co., Ardmore, was chairman of the Program Committee and during the General Committee meeting, May 6, was elected chairman of the General Committee for the 1948 Short Course, April 13-15. Other members elected were: Local Arrangements—W. H. Carson, dean, College of Engineering, University of Oklahoma; Program—C. E. Terrell, Southern Natural Gas Co., Birmingham, Ala.; Registration and Publicity—Kate A. Niblack, Oklahoma Utilities Association, Oklahoma City; Practical Methods—James L. Griffin, Northern Natural Gas Co., Omaha, Nebraska; Vice-Chairman, Practical Methods—George E. Greiner, Phillips Petroleum Co., Bartlesville, Okla.; Publications—B. F. Worley, United Gas Corp., Houston, Texas, and Exhibits—T. S. Whitis, Amarillo Oil Co., Amarillo, Texas.

W. H. Woods, Gulf Oil Corp., Houston, chairman of the 1947 Publications Committee, announced that the Proceedings would be published in bulletin form and a complimentary copy sent to each person who attended the 1947 Short Course. A sales copy may be secured for \$3.50 by writing to Dean

W. H. Carson, College of Engineering, University of Oklahoma. Only a limited number of bulletins will be published.

Cash prizes for papers on "What I learned during the 1946 Southwestern Gas Measurement Short Course" were awarded as follows:

First prize: Roy A. Eaton, Continental Oil Co., Basile, La.; second prize: R. M. Van-

Horn, Lone Star Gas Co.; third prizes: Homer Miesse, The Central West Utility Co., Bonner Springs, Kan.; Charles G. Hurst, Arkansas Louisiana Gas Co., Little Rock, Ark.; C. O. Walling, Jr., Gulf Oil Corp., Crane, Texas; J. M. Brown, Lone Star Gas Co., and Mrs. R. E. VanCleave, Cotton Valley Operators Committee, Cotton Valley, La.

1947 Convention Over, S.G.A. Looks at 1948



1947 Convention principals: M. H. North, Tulsa; R. R. Suttle, Dallas; Kenneth Fellows, Houston; Dean A. Strickland, president, S. G. A.; Frank C. Smith, Houston



S. G. A. past-presidents, left to right: H. Carl Wolf, A. G. A.; Frank S. Kelly, Jr., Sbreveport; L. B. Denning, Dallas; Charles B. Gamble, Birmingham; Edward N. Avegno, New Orleans; Chester May, Dallas; Dean Strickland, Houston, immediate past-president; C. H. Zabrzy, and C. B. Wilson, New Orleans



S. G. A. committee chairmen planning program and selecting committee members at May 16 meeting. Seated, left to right: Allen Burns, Industrial and Commercial; D. W. Reeve, Sales; Winnell Simmons, Home Service; W. L. Woodward, president; W. H. Ligon, Membership; Dean A. Strickland, immediate past-president. Standing: Fred D. Bradley, Convention; Carl E. Cloud, Transmission; H. K. Griffin, Operating; J. Frank Scott, Accident Prevention, and E. T. Anderson, Accounting

S. G. A. Workshop Studies Vital Problems

THE second annual Home Service Workshop of the Southern Gas Association held in cooperation with the plan of regional workshops sponsored by the American Gas Association Home Service Committee, was held on April 16 in Biloxi, Miss. as a forerunner of the annual convention of the Southern Gas Association.

Julia Hunter, Home Service director, Lone Star Gas Co., Dallas, presided as chairman. President Dean A. Strickland, in his opening remarks stated that Home Service work must adjust itself to current developments. He referred to the population influx to the South, which is adding new opportunities and responsibilities for Home Service.

Timely and important subjects made up the program. J. M. Lynn, Jr. of the Lone Star Gas Co. outlined ways in which Home Service can promote water heating, giving facts and figures on its development and use in the home.

"School Merchandise Programs" was covered in two parts: the sales viewpoint by C. L. Trevitt of Dallas and the Home Service viewpoint by Thelma Holmes of the Alabama Gas Company. Mr. Trevitt reported on good sales to schools in the Lone Star Gas System of modern gas ranges, water heaters and refrigerators. For fully satisfactory modernity in the 252 schools in the System a very active promotion was necessary. Miss Holmes detailed specific ways in which a program of school cooperation had proved successful in Alabama and outlined the steps in operation and the "do's" and "do not's" of procedure.

The United Gas Corporation in Houston, has carried on a safety program in the schools in cooperation with the Red Cross Accident Prevention and Safety Division, reported Mrs. Mildred Dees, who discussed the details of the school demonstration. A three-person team composed of the Home Service Director and two customer service men, acquaint students with the various gas company services and practices.

With the subject "Kitchen Parties for Dealers," Maxine Baggett, the Arkansas Power & Light Co., described a dealer's store and outlined a typical demonstration.

Three members of the Home Service Department of the Oklahoma Natural Gas Co. gave a customer demonstration on Fourth Zone Cooking using the Vendo Steam Cooker. The setting for the demonstration was a New Freedom Gas Kitchen provided by Servel, Inc.

Jessie McQueen of the American Gas Association, in "Views and News on Home Service" brought greetings from the Pacific Coast Home Service Workshop. She listed the firstline activities now carried on in various home service departments, pointed up the value of tried-and-true activities which could be reinstated as excellent sales helps, and indicated the renewed appreciation of the value of Home Calls. In conclusion, Miss McQueen illustrated "News of Home

Service" by showing charts and literature used by a number of gas companies.

The principal luncheon speaker was Elizabeth Sweeney, *McCall's Magazine*, who discussed "Better Public Relations Through Home Service." She stated that pulls away from homemaking are so many today that utility public relations programs are especially important. She placed friendliness first in importance as evidenced in telephone service, the call at the customer's home and informal demonstrations. The speaker stated that demonstration procedure could be varied to illustrate specific ways in which the homemaker's operations are carried on in the home kitchen and laundry, and urged reevaluation of home service programs so that every attention is given to meet current needs and be of most value to the gas company in load building and public relations.

Concluding the Workshop were three discussion groups presided over by Cephalie Lewis of the Atlanta Gas Light Company, Mrs. Winnell Simmons, Houston Natural Gas Corp. and Lenora O'Neal, Gulf States Utilities, Beaumont, Texas. The subjects included were "Work With Employee Families"; "School Equipment"; "Work With Children's Group"; "New Ideas to Promote the 'CP' Range"; "Kitchen Planning Services"; "Securing Audiences for Adult Groups"; "Dealer Relations"; "Obtaining and Training Home Service" and "Using the Frozen Food Compartments in Servel Refrigerators."

Pennsylvania Group Chooses Huebner

APPROXIMATELY 375 persons, an all-time record, registered for the Pennsylvania Gas Association meeting in Wernersville, May 20-22. James M. Huebner, Pennsylvania Power and Light Co., Lancaster, was elected president of the association.

Other officers elected were: First vice-president—B. V. Pfeiffer, The United Gas Improvement Co., Philadelphia; second vice-president—L. B. Richards, The Harrisburg Gas Co.; third vice-president—Andrew J. Leib, Luzerne County Gas & Electric Corp., Kingston; secretary—William Naile, Lebanon Valley Gas Co., Lebanon; treasurer—James A. Schultz, Consumers Gas Co., Reading.

The following Council members were also elected: T. W. McDonald, York County Gas Co., York; H. C. Snider, Pottsville Gas Co.; R. W. Uhler, Allentown-Bethlehem Gas Co., Allentown; Wm. J. Foster, George D. Roper Corp., Philadelphia.

Maryland Group Meets

CHARLES P. CRANE, executive vice-president, Consolidated Gas Electric Light & Power Co., Baltimore, Md., was elected president of the Maryland Utilities Association at its annual meeting in Baltimore on April 25. More than 400 representatives from gas, electric and transportation companies and allied manufacturers, in the state, registered for the meeting.

H. Carl Wolf, managing director, Ameri-

Florida-Georgia Group Installs Officers



Willard F. Rockwell, Rockwell Mfg. Co.; H. P. Thomas, new president Florida-Georgia Gas Meters Association, and A. M. Wickman, Servel

H. P. THOMAS, vice-president, Peoples Water & Gas Co., Miami Beach Fla., was installed as president of the Florida-Georgia Gas Meters Association at the close of the twelfth annual convention at Boca Raton, Fla., April 25-26. Approximately 200 delegates registered.

Retiring president, Buell G. Duncan, vice-president, South Atlantic Gas Co., Orlando, Fla., automatically becomes vice-president, while J. W. Owen, general manager, Central Florida Gas Corp., Winter Haven, Florida, was re-elected secretary-treasurer.

Newly-elected directors are Ted Bergman, Florida Power & Light Co., Miami, A. H. Stack, Tampa Gas Co., I. J. Wynn, Gainesville Gas Co., Harold Duguid, Jacksonville Gas Corp., and Frank K. Toney, Combustion Engineering Co., Inc., Charlotte, N. C.

Carlyle W. Sweet, general sales manager, Peoples Water & Gas Co., Miami Beach, was general convention chairman and also chairman of the sales section, while John L. Arnold, Albany (Ga.) Gas Department, served as chairman of the technical section.

At the morning session Lloyd C. Ginn, sales promotion and advertising manager, American Stove Co., and chairman, Domestic Range Division, Gas Appliance Manufacturers Association, spoke on "Selling Tomorrow's Customers Today."

The new certification program soon to be launched was described by H. Vinton Potter, New Freedom Gas Kitchen director, American Gas Association who concluded his presentation with a showing of the new Kodachrome sound-slide film, "The Flame of Freedom."

E. Carl Sorby, vice-president, George D. Roper Corp., opened the afternoon session with a dramatic talk, "Crumbs from the Table," emphasizing the demand for modernity in gas cooking appliances, which is filled by the modern gas range, built to "CP" specifications.

Breakfast Meetings
Round-table breakfast discussions Saturday morning were led by the following: Sales Section—W. M. Sutton, South Atlantic Gas Co., Orlando; Manufacturers Section—Ted Bergman, Florida Power & Light Co., Miami; Technical Section—John L. Arnold, Albany Gas Department; Accounting Section—J. K. Roberts, Florida Public Utilities, West Palm Beach. Following the breakfast meetings, the program was divided into two sections, Sales and Technical, with Carlyle Sweet chairman of the Sales Section and John Arnold chairman of the Technical Section.

Features of the Sales Section were talks by R. J. Canniff, A. M. Wickman and George S. Jones Jr., Servel, Inc. and an outline of advertising plans of the American Gas Association, by Charles W. Person, A. G. A. advertising director, in an illustrated talk entitled, "Spotlight on the Blue Flame."

Technical Section, features included talks by Warren C. Meyer, Stacy Dresser Engineering Co., James Chaisson, Jr., Southern Cross Forrester, Atlanta, N. R. Jones, Compania Cubana de Electricidad, Havana; T. M. Gilbert, Cutler-Hammer Inc., New York, and Joe Frink, Florida Power & Light Co.

At the midday luncheon, H. Leigh White-law, G.A.M.A. managing director, gave an interesting report on the present condition of the steel industry and prospects of supplying steel for pipe and appliance manufacture.

Indiana Association Chooses Officers



L. B. Schiesz and Dean T. Burns, elected vice-president and president of the Indiana Gas Association at the group's annual convention

APPROXIMATELY 300 delegates attended the thirty-seventh annual convention of the Indiana Gas Association May 15-16 at the French Lick Springs Hotel, French Lick, Indiana. Theme of the convention was "The Blue Flame Is On the March."

Dean T. Burns, assistant general manager,

Citizens Gas & Coke Utility, Indianapolis, was elected president of the association and L. B. Schiesz, president, Indiana Gas & Water Co., Inc., was elected vice-president. Clarence W. Goris, Northern Indiana Public Service Company, was re-elected secretary-treasurer. The following directors were named: R. S. Brunner, Terre Haute Gas Corp.; C. M. Cullison, Central Indiana Gas Co.; F. W. Dopke, Indiana Gas & Water Co., Inc.; and E. E. Linburg, Richmond Gas Corporation.

Outstanding speakers addressed the delegates at the two-day meeting. Dr. M. O. Ross, president of Butler University, stated that the United States must consciously plan to maintain high level production and employment if the free enterprise system is to continue to work successfully. Grove Patterson, editor of the *Toledo Blade*, who has toured Russia three times and traveled extensively in Europe and Asia, discussed Russia's foreign policy.

R. H. Hargrove, president of the American Gas Association, predicted years of great expansion for the gas industry. Mr. Hargrove also discussed the role the A. G. A. has played in the industry's progress through its research, promotion and advertising programs.

and faithful service in the Association, the industry and as a member of the A. G. A. Executive Board for nine years and its president in 1922, then pays the following tribute:

"Upon his native ability, his enduring power of growth, his inherent modesty, un-failing courtesy, high integrity, his kindness and generosity, Mr. Barnum built a successful and full life. His qualities of mind and heart endeared him to all who had the good fortune to know him. The gas industry has lost an able and devoted leader."

Rochester Employees Donate War Service Memorial



President Alexander M. Beebe and R. DeWitt Pike, chairman of the War Service Committee, Rochester Gas & Electric Corp., in ceremonies dedicating employee-donated memorial plaque

Obituary



C. F. Johansen

CHARLES F. JOHANSEN, Treasurer of Atlanta Gas Light Co., Atlanta, Ga., died at his home April 30 after a short illness. He had been associated with Stone & Webster and affiliated or supervised companies during the entire course of his business career and was widely-known in the gas industry.

Starting with this organization in 1911, in Pensacola, Fla., his birthplace, he served also in Tampa, Fla., and Houston, Texas, holding the various positions of cashier, chief clerk and assistant treasurer before becoming treasurer of Atlanta Gas Light Co. in 1936.

Mr. Johansen is survived by his wife, a daughter, two sons and two grandchildren.

C. M. BENEDICT, retired employee of The United Gas Improvement Co., Philadelphia, died on May 3.

Mr. Benedict served with The United Gas Improvement Co. from 1895 until his retirement in 1933. He had been located in Johnstown and Gloversville, N. Y., with the Fulton County Gas and Electric Co., now part of the Niagara Hudson System; the Wyandotte County Gas Co., Kansas City; The Philadelphia Gas Works Co., and had been vice-president and treasurer of the former Charleston Consolidated Railway and Lighting Co., Charleston, S. C., and president of the Des Moines Gas Co., Des Moines, Iowa.

HARRY BACHARACH, former chairman of the New Jersey State Public Utilities Commission and mayor of Atlantic City for many years, died at his home in Atlantic City May 13.

Mr. Bacharach served three terms on the State Public Utilities Commission, the first a two-year term beginning in 1921, after that, two six-year appointments, one in 1929 and one in 1935. He was president of the commission from 1935 to 1941. In 1941, he became managing director of the New Jersey Utilities Association. He was executive director of that association at the time of his death.

He leaves his wife, Mrs. Hattie Bacharach, and a brother, Isaac Bacharach.

FRANK L. BLACKBURN, for many years a member of the managing committee of the Accounting Section, American Gas Association, and director, vice-president and secretary, Gas Advisers, Inc., New York, died at

Bryant Starts New Line



Lightweight blower

ANEW line of lightweight "Hi-Flo" blowers, which are direct-connected and sturdily constructed of aluminum housings, bases and side plates, with a simplified steel impeller, has been announced by the Bryant Heater Co., Cleveland, Ohio.

The blowers are designed for a constant pressure output over a broad capacity range and for ease of application and mounting in conjunction with other units. Complete data may be obtained from the company on request.

Tribute to Dana D. Barnum

ARESOLUTION expressing profound sorrow at the death of Dana D. Barnum on March 19, 1947, has been entered in the minutes of the Executive Board of the American Gas Association and a copy sent to the family of Mr. Barnum.

The resolution reviews Mr. Barnum's long

his home in Westfield, N. J., April 26, following an illness of several months.

Born in Fortville, Ind., June 4, 1878, and graduated from Purdue University, Mr. Blackburn was associated with the Cities Service organization for 40 years. He began his career with the gas department, Denver Gas & Electric Co. where he served in various capacities until 1910, after which he came to the New York office of Cities Service Co. where he engaged in property examinations, engineering and economic studies and was in charge of the statistical department until 1938. In the latter year, he became director, vice-president and secretary of Gas Advisers, Inc., mutual service company in the Cities Service organization.

He is survived by his wife, Mrs. Gertrude Whetsel Blackburn, and a son, James W. Blackburn.



GAS COMPANIES*

Citizens Utilities Co., Greenwich, Conn.
(H. B. Atkin, Vice-President)

ASSOCIATE COMPANIES*

Pittsburgh Consolidation Coal Co., Pittsburgh, Pa. (Joseph Pursglove, Jr., Vice President)

MANUFACTURER COMPANIES*

General Engineering Co., Bay City, Mich. (Erwin J. Weggel, Manager)
Ohio Stove Co., Portsmouth, Ohio (H. M. Scott, Sales Manager)
Santa Clara Metal Products Co., Santa Clara, Calif. (W. P. Lind, President)
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INDIVIDUAL MEMBERS

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Saul J. Berger, Cantleek Products Corp., Flushing, N. Y.
Herbert J. Bertram, Bertram Gas Equipment Co., Belleville, Ill.
T. J. Bianucci, Pacific Gas & Electric Co., Stockton, Calif.
Edmund J. Burke, The East Ohio Gas Co., Akron, Ohio

* Names in parentheses are Company Delegates of the American Gas Association.

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Servel Portfolio

A NEW refrigeration portfolio for 1947 showing Servel's complete advertising and sales promotion program on the new gas refrigerator has just been released to the gas industry. R. J. Canniff, advertising and sales promotion manager of Servel, Inc., has announced.

Mr. Canniff pointed out two special features of the portfolio. The first is a "Memo to Management" which is a quick-reading digest of important facts about the refrigeration load. The second is six descriptive file folders which contain all available advertising materials put out by the company including local advertising materials, direct mailing literature, retail salesmen's aids, home service materials, displays and signs and salesmen selection and training.

In the introduction to the portfolio Servel points out, "Today is the greatest opportunity that the refrigeration market has had for 20 years."

In releasing the portfolio Mr. Canniff said, "Seven million families are in the market for refrigerators." However, he stressed now is the time for organization, planning and management to exert greater sales effort in the approaching buyer's market.



Gas refrigerator promotion piece

A. G. A. NATURAL GAS CONFERENCE

(Continued from page 263)

Accounting for and tax treatment of gas in storage in reservoirs caused forth an interesting discussion, particularly with reference to the depreciation and amortization of lease or land cost for the reservoir and equipment installed for the input and output of the stored gas.

Treatment in company accounts of tax reductions from charging off for tax purposes of intangible drilling costs presents a problem for those companies not regularly engaged in drilling activities. General opinion was that companies consistently engaged in drilling programs would not distort their comparative net income figures as a result of crediting savings on taxes from the deduction of intangible development costs to tax expense if approximately the same amount were spent each year. For those companies not regularly engaged in drilling activities, such savings should probably be handled as a credit to surplus.

Gas men requesting information on classification of accounts for propane, butane and other by-products of natural gas were advised that an A. G. A. committee headed by W. H. Ainsworth, United Gas Pipe Line Co., Shreveport,

La., has prepared a report on this subject which undoubtedly can be secured by writing to Mr. Ainsworth.

Among other matters discussed at the meeting were training programs for natural gas company accounting personnel, job evaluation programs, merits of centralized versus decentralized billing of customers, and the direct connection of customers due to the present shortage of meters.

HOUSE HEATING LOAD PROBLEMS

(Continued from page 269)

first cold days of winter, all gas utilities are subjected to the immense difficulty of lighting-up and servicing this multitude of househeating jobs of high saturations.

In the northeast and north central part of the nation, many companies are restricting the sale of househeating until such a time as they are able either to produce and/or purchase sufficient gas to handle the advancing demand. Some are able to enforce their own curtailment by restricting the number of househeating jobs they will add to their lines during any one year, or by requiring their prospective customers to register such jobs with them.

Most of the companies restricting the sale of househeating file such restriction as a part of their tariff, approved by the appropriate regulatory body. Where such restrictions are in force, the gas company usually allows the installation of gas in new homes. Installation of gas-fired equipment is sometimes allowed for hardship cases, but very few companies will allow conversions to gas from other fuels.

The purpose of the accompanying charts and table is (1) to illustrate the general trend in househeating as compared to the normal growth of residential customers across the country; (2) what we find to be the trend in the peaks in winter as compared to base summer business; (3) what the ratio of peak day to summer day is, depending on the amount of saturation, and (4) the amount of gas used per customer on a peak day, on a base summer day and on the average day during the year.

By reference to these curves which are averages, we can anticipate what may be expected by any one gas company with an increase in its househeating saturation. Although companies in different sections of the country vary to some extent among themselves, there is still a general trend that bears a rather common, important and characteristic curve.

Personnel Service

SERVICES OFFERED

Utility lawyer, member New York, Maryland bars, 27 years' experience in gas, electric and transportation fields in private practice and with Federal and State governments, desires position counsel public utility or holding company. Salary \$10,000. 1542.

Sixteen years' experience in the industry:—production, distribution, utilization, purchasing, sales, rates, special studies, employee training, and customer relations are available to progressive property or manufacturer in a position of responsibility. College graduate, married, go anywhere. Best of reasons for leaving present successful and secure position. (40) 1543.

Gas Heating Engineer and experienced man in all types gas appliances since 1910. Would like connection with manufacturer who has production ready for the trade. 1544.

Controller, Treasurer, Executive Accountant. Twenty-one years' wide and varied utility experience as chief accountant, controller, and

treasurer, with management background, including parent and subsidiary companies controllership and financial problems. Practical experience in all phases of utility accounting, financial and budgetary control and taxes. Desires position of responsibility. 1545.

Recent Graduate of Liquefied Petroleum Gas Institute, former Manager 2500 Meter Water Gas property, seeks new connection. Not averse to foreign service, having lived in Mexico and speaking Spanish. (35) 1546.

A man with large acquaintance and years of successful **Engineering Sales Experience** in gas field desires connection with well established company. If you have a sales problem I would like to talk it over with you. 1547.

POSITIONS OPEN

Gas Plant Engineer for plant in New England, having several years experience in coal and water gas manufacture. Supervisory position. Write fully, giving experience, salary expected and date available. Send photo. 0487.

Heating Engineer for work in the development laboratory of large middle western manufacturer of central heating equipment; young man, sales personality, field experience desirable. Write, stating salary requirements. 0493.

Graduate Engineer with field experience on gas fired heating and water heating equipment, to take charge of field service training for firm with national distribution. Must have good personality and the ability to conduct service schools. Will be required to travel as territorial work demands. 0494.

Operating Engineer with C. W. Gas experience, college, graduate, and demonstrated administrative ability to have entire charge of engi-

neering and operating production department of large Eastern Gas Company. Excellent opportunity at attractive salary. 0495.

Home Economics Representative to take charge of department which will be organized consisting of one director and one or two assistants. Activities will include platform lectures, and other home service work covering foods and proper uses of appliances. Please write and give qualifications, age, education, experience, salary expected, etc. Correspondence strictly confidential. Good salary and excellent opportunity for advancement. 0496.

General Superintendent to supervise over all operation of combination coal and water gas plant and distribution department. Experienced in handling personnel. Plant located in North Carolina with approximately 300 million per year. 0497.

Product Development Engineer, must be familiar with all types of gas appliances. Have experience to take charge of development, experimental design and test work on valves and controls for gas appliances. Good chance for advancement with well-established valve manufacturer. Write, giving experience in detail and salary expected. 0498.

Manager-Superintendent for three small neighboring Eastern networks totalling 5000 meters water gas and LP-gases including potential bottled gas fringe system. 0499.

Accounting Methods Specialist who has had a broad, successful experience in utility general accounting methods and procedures. Must have ability to sell himself to others. Knowledge of accounting machine operation and applications essential. College or accounting school graduate. Good future opportunity for right man. Some travelling. Give complete information including salary expected. 0500.

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Exec. Sec.-Tr.—George W. Allen, 7 Astley Ave., Toronto.

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Pres.—W. Lee Woodward, Zenith Gas System, Alva, Okla.
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Pres.—Erwin C. Brenner, Milwaukee Gas Light Co., Milwaukee, Wis.
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